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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXXII. No. 3256.] LONDON, OCTOBER 7, 1925. [77TH YEAR. PRICE 1s.

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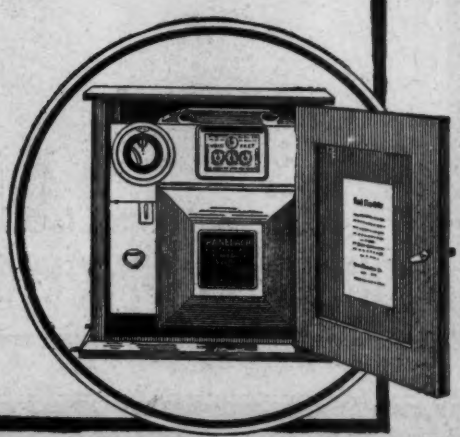

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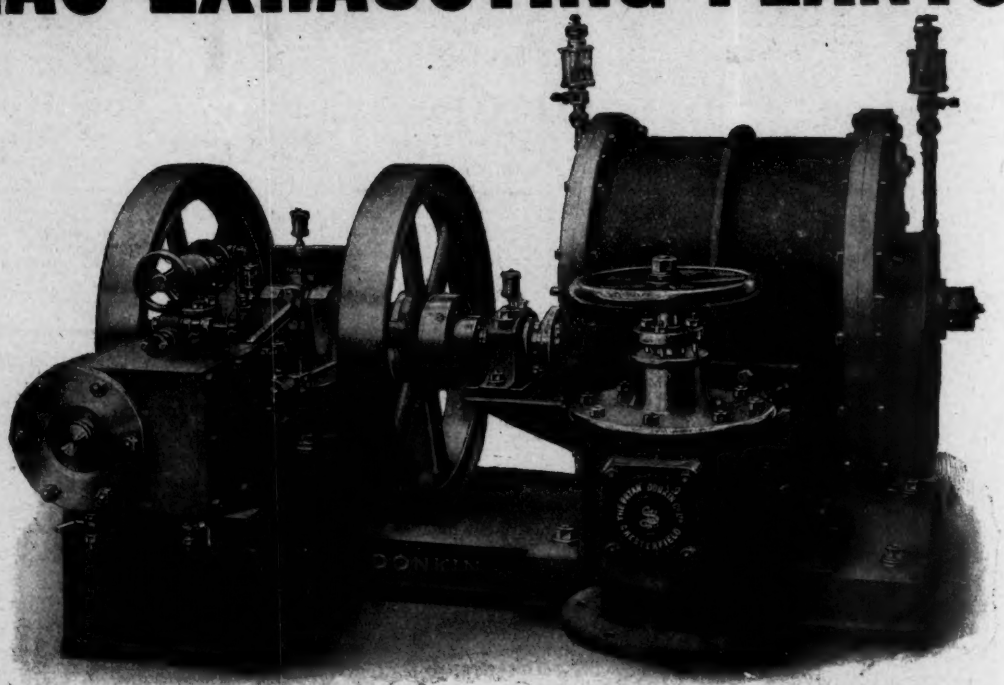

Fig. 732.
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VOL. CLXXII., No. 3256.] WEDNESDAY, OCTOBER 7, 1925. [77TH YEAR.

EDITORIAL NOTES.

The Coke Competition Committee's Awards and Report.

THE work of examining the papers received in the Coke Competition, of making awards, and of rejecting contributions that had not sufficient merit or usefulness to justify favourable recognition, has been completed. We have pleasure to-day in publishing the decisions of the Committee—Mr. A. W. Smith, General Manager of the Birmingham Corporation Gas Department, Mr. W. B. Leech, Engineer of the Beckton Works of the Gas Light and Coke Company, and Mr. Arthur F. Bezant, Editor of the "JOURNAL"—and in congratulating the principal winners upon the honour which attaches to their success. The decisions were unanimous. The heaviest and most responsible part of the task entrusted to the Committee was the reading by them individually of the large mass of material comprised in the fifty-seven papers received. But to each member the perusal was both interesting and instructive, seeing that several of the essays are by men who have made, and are making, scientific study of the essentials to the production of high-quality gas coke (having regard to the maintenance of the efficiency of gas production), while others contain the views and experiences of men operating in diverse circumstances in connection with the handling and preparation of coke, and with its applications and marketing. We believe, with the Committee, that the collation of this vast amount of knowledge, results of experiments, experiences, and suggestions will be of considerable value to the industry, and will issue in the production of coke being dealt with in a more scientific manner, which is its due in view of the importance of its position in the economics of every gas undertaking. Gas coke as made and marketed to-day has had its ups and downs. When conditions were congenial, as in the years succeeding the war, everything went merrily with coke; but as more normal international circumstances have been reached, and coal has fallen in price, the old sensitiveness of coke has returned; and we are now looking gloomily upon growing stocks and low prices.

The state of coke during the past year has been such that it is bound to direct greater attention than would otherwise have been the case to the voluminous literature the competition has yielded; and we are hoping that it will supply the opening of a new chapter in the history of the chief secondary product—first, by raising the standard of quality and physical characteristics; secondly, by inducing a more serious study of the methods of application and vending; and, thirdly, through the changes in both directions, by promoting a demand for the commodity which will be permanent and increasing, and largely free from the violent vacillations to which it is now exposed, as witness present conditions. If it does this, the hope of the promoters of the competition will be realized. The sole intention of the competition was to benefit the gas industry; there was no subterranean object. It has long been Sir Arthur Duckham's view that coke is the neglected one in the gas industry's family of products. The competition was his idea; and it was the pleasure of the "JOURNAL" to give effect to it, through the munificence of the Woodall-Duckham Companies in placing in the Editor's hands £1000 for awards to be determined by the independent Committee already named. But though the providers of the money withdrew from all further participation in the organizing or conduct of the competition, and left the Committee free and unfettered, we are of opinion that the gas industry itself would have regarded it as inexcusable had we not made public acknowledgment of such a handsome gift, voluntarily tendered, to enable something practical to be done at a stage of critical importance to gas coke. That "something practical" can, of course, at present only take the form of a stimulus in setting to work to elevate the position of gas coke among the fuels. However, we heartily congratulate both the Woodall-Duckham Companies and the gas industry upon the valuable result of a valuable conception; for without the incentive provided by the competition, so much material of intrinsic worth would not have been collected with such promptness, nor would have seen the light of day so quickly in such complete form.

Regarding the awards, it will be seen from the Committee's report that, of the 57 papers received, 33 were successful, and 24 were rejected. We think it may be said that the latter figure evidences the thoroughness with which the Committee did their work. Moreover, in the exercise of their discretion, it is noticed that they felt it only right in certain instances to emphasize their recognition of value by advancing the monetary awards and by creating new ones. This applies especially to Section I., the winning papers in which are in their directional value of pre-eminent worth in comparison with those contributed to the other sections. A point is made in the report of the fact that the papers of greatest value came from the contracting side of the industry, from scientific investigators, and workers believed to be associated with the coke-oven industry. We congratulate particularly the contracting side of the gas industry upon what must be described as a revelation of the scope of their technical research, and, indeed, of the capacity of the scientific and technical workers associated with them. There are coincidences in this connection. The competition being open to the whole of that part of the world interested in coke, the Research Staff of the Woodall-Duckham Companies sent in a contribution which (with the authorship known only by a *nom de plume*) gained a unanimous decision as being so much ahead of the other contributions that it gained the capital prize of £200. The one which obtained the second award was of such merit that the Committee raised the figure from £75 to £100; and this, too, was another surprise for the Committee when, after the completion of the making of the awards, the sealed envelopes were opened; for the second prize winner was a gentleman connected with West's Gas Improvement Company! Also of high merit was another contribution from a well-known gentleman associated with the technical work of Messrs. Robert Dempster & Sons, Ltd. Needless to say, this issue on the scientific side of the competition was not only a surprise to the members of the Committee, but it caused them to reflect—among other things upon the good sportsmanship shown by these business rivals, and upon the influence of the work of the manufacturers and contractors upon the progress of the technical and commercial interests of the gas-supply in-

dustry. Whatever influence these papers jointly have in creating a new interest in the production of coke, we shall not forget the credit due to the sources from which they came. Honour must always be given where honour is due.

The chief winning papers will be published; and the information will thus be made free to the whole of the coal-carbonizing industries. The report of the Committee upon the contributions only goes beyond their judicial work by giving expression to certain impressions which were produced by the study of the papers for the purpose of making the awards. The writers of the winning papers have concentrated largely upon the improvement of the coal charges to be carbonized, not only by the reduction of the ash, but by blending (in suitable proportions, as determined by investigation) coking and non-coking coal; and they give their reasons. It has to be admitted that retort material and temperatures have had a large amount of attention paid to them; but it is only in recent times that serious consideration and systematic investigation have been given to the problem of whether progress in carbonizing conditions in gas-works can be economically made by devoting attention, in the manner indicated, to the charge itself. It is clear the Committee consider there are large possibilities in this direction, and that a case has been made out for a thorough and definitely organized research by the gas industry to ascertain whether economy and efficiency can be gained, and a coke of higher inherent value (through changed physical conditions) be secured, along the suggested lines. Too obvious to need expatiation is the bearing upon sales of a higher standard of coke.

There will be opportunities for comment upon the papers as publication proceeds; but in this reference to the Committee's report, we merely emphasize their plea that the issue of this competition shall be the starting point of work deliberately planned for raising the status of coke and giving to it a greater continuity in the scale of demand. To do this the popularity of coke must be created by its own merits. What will the gas industry do to attain an end so devoutly desired, but (speaking generally) consistently neglected?

Our Manufacturers and Pure Research.

There must have been great tenacity and patience on the part of the men of the gas industry in its old days for it to have made the progress that it did solely by empirical methods or by the laborious process of working-scale trials. We remember how, in our early years in the industry, these things were done—how new ideas came, and without theoretical consideration or justification, because the basic truths were then largely unknown, they were tried-out, and, perhaps nine times out of ten, had to be scrapped as having no advantage. Those were the days of slow progress through sparse knowledge and indeterminate results. To-day everything is being done differently—progress is proceeding at faster rate, and the revelations of scientific research are making the position of the gas industry more secure day by day by the eradication of defect and the setting-up of higher standards of efficiency. This is the result of a steady evolution. Chemical and scientific work in the industry has gradually unfolded itself, with the "gradually" emphasized because of the at one time widespread indurated belief in the sufficiency of traditional method. But the emollient influences of time and of incontrovertible fact have effected a universal change; and for some years now in the best-appointed gas undertakings laboratories for controlling processes and results have been the vogue. In the works of our manufacturers of gas plant and gas-consuming appliances, too, the same development has taken place. In the realm of gas-heating, we remember to-day the work of the late Thomas Fletcher; and we recollect, too, the first real establishment of laboratories at the works of Messrs. John Wright & Co., of Birmingham. Many years have passed since then; but those laboratories for the testing of new ideas and new designs, and for controlling foundry and other operations, were the outcome of the fascination that the laboratory had always possessed for Mr. H. James Yates. By example and proof of efficacy, what was then done has had influential effect in many other directions—not only to the advantage of the manufacturers of gas heated or heating appliances, but to the whole gas-supply industry, as witness the current efficiencies of gas-consuming appliances. The old stage-coach days of the gas industry have given place to the highly finished motor-car days in respect of gas application, and that through research.

We have learned the value and necessity of research in the realization of efficiency in the production of our primary and secondary commodities, and in their application. Now we have passed beyond the stage of merely seeking the aid of laboratories in supervising and controlling processes, and putting to the test new conceptions; the industry is utilizing them to-day for the purpose of discovery and the extension of knowledge. Leeds University, the Imperial College of Science, and other of our learned centres are, directly or indirectly, associated with the gas industry in the work of exploration; the Fuel Research Station and some of the larger gas undertakings are also engaged on pure research into matters that are fundamental and vital to our progress and protection. They are able to do this through the developments in the implements and processes of research, for research like all else—looking back upon it from the standards of refinement of to-day—had its crude beginnings. And now among the manufacturers we have Radiation Limited leading the way by establishing central research—chemical and physical—laboratories for the investigation of fundamentals. Such work is speculative, but it is essential. Results may sometimes be of the negative order; at other times valuable from modest degree to something priceless. Such work could not be done by an individual firm such as at one time existed in connection with the production of gas appliances. It has only been made possible by the pooling of the resources of half-a-dozen firms under the title of Radiation Limited—this without interfering with the ordinary works laboratories for maintaining standards and efficiencies in the day-by-day routine. We welcome this addition to the industry's capacity for pure research. It is a worthy addition, as will be seen by the descriptive article and the account of the opening by Mr. D. Milne Watson, which we publish in this issue. The laboratories themselves are places in the equipment of which we saw the other day such learned ones as Dr. Haldane, Profs. Boys, Smithells, and Bone, Mr. W. J. Atkinson Butterfield, and others revelling—equipment approved and complete from furnaces to highly sensitive testing appliances, with an environment in which the talented staff under Dr. Hartley can explore with comfort, and with all that is necessary to hand. In gas utilization there are many problems that require investigation; and the solution of one often opens to view other possibilities. There will be no lack of work; and it will be of a highly specialized character—such specialization as can only be achieved by the intimate association of scientific ability and resource with knowledge of practical application.

We welcome heartily all enterprise in work of this kind, for an industry such as that to which we all belong cannot do without pure research. Whatever the nature of the beneficial results from these laboratories, they will be shared by the entire industry. Use cannot be made of them without, as Mr. Milne Watson indicated in other words, conferring benefit not only upon those who are responsible for the foundation and organization of the laboratories, but upon the industry they serve and upon the users of the appliances. Gas heated and heating appliances of all kinds have made large strides forward in thermal and operating efficiency; but there are problems the solving of which it is hoped will bring additions to the credit of such goods. Occasionally, too, the industry is attacked on points of more or less assumed defect. By research, Mr. Yates points out, the way has been found to ensure complete combustion; and that assured, we can snap our fingers at those who whisper of CO, and start people rambling into the avenues of false accusation—frequently through motives born of trading rivalry. That we can now set at rest—through pure research, which has revealed how to ensure the complete combustion of gas. Again, the gas-fire has been charged with being too incandescent, and with emitting short wave-length energy.

That has been proved to be incorrect; and it is hoped to develop matters in this direction. The noise of gas-fires, where proper laws are observed, is a thing of the past. Ventilation, refractories, enamels, cooker, furnace, and water-heater efficiency offer fields—indeed, there appears to be no finality to the service which such specialized laboratories can undertake in the work of gas application and utilization. The fruits of the work are not only for to-day, but for to-morrow, and for all time. The public are now by their patronage showing a large confidence in gas; by the work that will proceed in these laboratories, and in those elsewhere, that confidence will be—must be—continually enlarged. Because these central research laboratories of Radiation Limited constitute a new milestone in progress along the scientific road from which issues real advances, we give them (as Mr. Milne Watson did in the name of the gas industry) a hearty welcome, accompanied by the sincerest wishes for a successful career. We cannot have too much research of this kind. Some speak of research centralization in order to avoid overlapping and duplication, and thus waste of money. But the answer to that is we cannot centralize brains. The brains that are at work in these laboratories may pursue lines of work and realize results which might not accrue elsewhere; and from elsewhere may come, through other routes being followed and other brains at work, other beneficial results. We believe in independent work as well as centralized; and Radiation Limited believe in it, too, for they have lately endowed a Fellowship at the Imperial College of Science for the purpose of research. To that enterprise, also, we wish abundant success.

Success in the Worst Circumstances.

In some places abroad, there is hardly a gas light to be found. Electricity at a low price compared with gas has captured the lot; and yet the gas undertakings prosper. As the lighting load has declined, countervailing consumption for cooking and heating and industrial purposes has in time come along, until the volume of lost business has been restored. In some instances compensatory work has gone along *pari passu* with the diminution of the lighting load, and then has come the time when business has progressed beyond the former level at which the reduction began, and even in cases lighting has been restored. This has not been done by sitting still; it has meant hard and diligent work. Much the same experience has been the lot of certain gas undertakings in tropical regions and in the northward cold regions, where in respect of cost water power favours electricity, while the cost of imported coal is hostile to gas in its rivalry. But there is no disheartening the gas managers; they enter the fight with spirit, and make good their lighting losses by new business. In this country, there are places where there is insufficient heart put into the competition on the side of gas; and sometimes we wonder whether this is not due in part—perhaps largely—to administrative parsimony. We see advertisements where extraordinarily low salaries are offered; we know of cases where responsible gas managers get only 20s. or 30s. a week more than Poplar roadsweepers. There is no encouragement there to do one's best. It is all very well to talk sentimentally about the duty of a man who accepts service and insufficient payment, because no alternative offers; there is not only the duty of a man, but the duty to the man, if one hopes to get from him the best that is in him, especially in connection with the preservation and expansion of business.

Some gas men think the competition here with gas is about as keen as it can be anywhere. It is not. In tropical regions, or in countries with water power, it is much worse; and it is remarkable how, with push, gas holds its own in such places. We have an idea that this is—at all events it is in one case of which we know—due partly to the fact that the gas manager is allowed good rope, and shares in his successes. We are led to these reflections by an interesting conversation we have had with Mr. J. W. Brown, who is home from Barbados for a holiday; and we must congratulate him and his Board upon the fact that the small undertaking of which he has charge has been removed from the non-paying state to a paying one—a dividend of 6 p.ct. being paid last year to the shareholders. One or two peculiarly interesting little incidents relating to competition fell from Mr. Brown. As an instance of how hard fighting sometimes brings reward, he mentioned that—after the local Government had given up the use of gas for the wharves and bridges in favour of electricity, and had had some experience of it—he succeeded, by perseverance, in securing a contract for five years for an installation of inverted 2-light gas-lamps, the excellence of the illumination and reliability being factors in the decision. He has also entered into a three years' contract with the local hospital for gas for cooking purposes. Another point of interest is that the Barbados Company are, we think, in a unique position in respect of oil refining. They have installed a small oil-refining plant, and are now producing their own gas oil, and selling petrol, paraffin, and fuel oil. This pays—in Barbados. The more roseate condition of gas affairs there is due not to the price to the consumer—though gas has different economic values in different parts of the world—but to sheer tenacity and spirit.

What is found in Barbados is found in Bergen, though the two places are a great distance apart, and with altogether different climatic conditions. Mr. Brown has visited Bergen; and he was much impressed by the energetic manner in which Mr. Irminger is conducting the fight against electricity produced by water power. In many instances where electric light has been in use for some years, the lamps are being removed, and modern gas lamps installed. Time has its revenges. Especially is this the case in public squares, and at the road corners and crossings of Bergen. The reliability of gas has forced itself into recognition, and so has the unreliability of the electricity supply. This is one of the things that is ignored in this country by some public lighting authorities. They talk of "Safety First," and then proceed to practise the contrary by favouring the most inconstant means of lighting. Even collapses of the electricity supply and the throwing of streets into darkness do not cause them to mend their ways. They continue to expose the public to the risks of unreliable lighting. Perhaps they will at some time reach the same standard of wisdom as in Bergen, and now at Barbados. Then, again, in Bergen the tunnel approaches to the platforms of the cable tramway, which carries the people to the restaurant at the top of the hill (known to all visitors to Bergen) were being fitted, at the time of Mr. Brown's visit, with incandescent gas-lamps, which are to replace the present electric bulbs—this change not only because of the reliability of gas, but because it is found to be a cheaper and superior light. With regard to cooking by electricity, Mr. Brown was informed that many people who had installed electric cookers were giving them up and returning to gas. Breakdowns and cost of replacements have proved tremendous drawbacks to electric cooking.

These happenings in Barbados and Bergen are with gas in the former place at $3 (12s. 6d.) per 1000 c.ft., and in the latter at approximately 3s. 10d. If the managements of these places can succeed in re-installing gas for public lighting, then there is good reason for gas managers in this country, in their easier circumstances, to operate with the view of bringing conviction that they can give the best value for money. "Safety First" for the public—though the factors of genuine economy and efficiency are ignored—should be the primary consideration of the street lighting authorities, and not the question of patronage, although the electricity supply is a municipal institution and gas supply a private enterprise. Consideration of the conditions at Barbados with (regarded from the standpoint of this country) expensive gas, and of those at Bergen with cheap electricity, and in both cases the successes of gas in the competition, should spur-on gas men here to do their utmost to recover lost territory, notwithstanding that the consumption of gas is expanding in a favourable manner. But there are many places in this country where there is competition, where the opportunities are not extensive, and where the gas managers find no encouragement in their attenuated salaries to put up a spirited fight against the rivalry of the coal, electrical, and oil competitors. We urge gas administrators speedily to rectify this state of things.

Coal and Gas Business.

It is impossible to close one's eyes to the fact that so far as coal is concerned the future is somewhat obscure for the gas industry. It is the same for all industries dependent on coal; for no one can predict the outcome of the inquiry by the Royal Commission. All we can do is to hope for a happy issue by next May, and meantime pursue a circumspect policy, with coal at present prices. The coal industry is suffering considerably from the existing unsatisfactory condition of things at home and the better competitive position of producers abroad. Markets which were once held by British coal are being gained to greater and greater extent by countries which can sell at a lower price than our own; and there is no chance that we shall regain them while the miners produce such a small average per man-shift compared with the past, and this despite the increasing use of mechanical cutters where they can be applied. The fact shows that there are influences at work which are preventing the utmost possible output. The growing use of mechanical cutters ought to have done something to relieve the diminution of production per man brought about by the reduction of the shift by one hour a day. But it has not accomplished anything of the kind. What is the reason? Through high costs the export business in coal is bad and unpromising. At home the retail household coal trade is at a poor level, and only the nip of approaching winter will induce people to charge their cellars, though they have less need to do so now with gas fires and gas cookers in position and always available. Moreover, the retailers have in London put on their winter prices; the increase over summer prices being from 2s. 6d. to 4s. per ton. Summer buyers really gain an advantage at the expense of the winter ones. In order to mitigate the winter pressure, prices are reduced in summer to induce people to stock their cellars; but they do not trouble to comply so freely now that they have to rely less on coal. The fact remains that in many cases the overhead charges of the merchants are in summer as heavy as, if not heavier than, in winter; and a proportion has to be borne by the better prices and the enlarged demand in winter. The demand for industrial fuel also continues poor; and not only coal but coke is suffering from this. There are no present indications of the price of gas having to be further increased; and the fact is an advantage when the price of coal is put up to winter level. The autumn and early winter are impolitic times at which to raise the price of gas, unless from sheer necessity. That is a period of large consumption and development of use; but an increase of price then is apt to put on the brake, and impede the rate of business expansion.

The Coal Commission.

From present indications, we should imagine that the Coal Commission will begin their sittings next week for the hearing of evidence in public. But the members have not been idle. They have been descending pits in Lancashire and Yorkshire, and this week will probably visit mines in South Wales, in order to make themselves acquainted at first hand with actual mining conditions. Between these visits, they have been digesting the evidence given at recent inquiries, so that they will not enter upon their task of receiving evidence without knowledge which will be invaluable. There are other points bearing upon the inquiry. One is that arrangements have been made to enable eight or ten members of the Industrial Group in the House of Commons to visit typical pits in various coalfields, and make personal investigation of the circumstances in which the coal industry is being carried on. Another item of interest is that the statement of payments in respect of the coal subvention for the month of August (made up to Sept. 30) has been issued by the Mines Department; and the total payments reached £1,517,678. At this rate, the £10,000,000 stands a poor chance of being sufficient for the nine months. With regard to the dispute over the interpretation of the terms of the coal settlement, the General Council of the Trade Union Congress have addressed a letter to the Miners' Federation supporting them in their view of the matter. They hold that it was distinctly understood by the House of Commons and the men's representatives that the wages of miners were not to be reduced during the period of the subvention. The Prime Minister, the Mines Department, and the owners hold that the terms of the 1924 agreement were to be continued.

Northern Leicestershire Promotion.

In last week's "Journal," comment was made on the prospectus of the Northern Leicestershire Gas Light and Coke Company, Ltd. (p. 796); and it was shown that it was a promotion to be shunned by investors. The whole thing is for impudence on much the same level in company promotions as certain of those we have had to deal with in the past. Incidentally it is noted that the companymongers with their nest at 43, Cannon Street, have quieted down somewhat the last few months—ever since, in fact, they found, through a public inquiry, that a Government Department had got their activities under rather unpleasant critical observation. Perhaps the same coterie will break new ground, under other names and fresh disguises. We commend the contents of the Northern Leicestershire scheme to the notice of the same Government Department, and suggest a comparison of the business of the Ibstock undertaking as it exists and has existed with the statements made in the prospectus. Among other things it will be seen that the capital sought—£30,000 in 8 p.ct. profit-sharing bonds—works out to something like £6000 per million c.ft. of gas sold! This, we think, about "takes the biscuit!" Its enormity was indicated in the comments last week. A little investigation of the past reveals the position to be worse than we represented it last week. Some four years ago the capital of the concern was £3000 or £3500; and then we know an estimate of the value of the works was (on the liberal side) £1800. The full productive capacity—not gas sold—was then about 6 million c.ft. The sale of gas in 1918 was rather less than 4,250,000 c.ft.; it ascended to about 4,620,000 c.ft. in 1919; and in 1920 it had dropped to approximately 3,500,000 c.ft. The make last year was in the neighbourhood of 5 million c.ft. The number of meters connected four years ago was 240; and last year it was about 300. It is unnecessary to say more after the comments in our last issue. By the way, a copy of the "Journal" was sent to one of the Directors—Mr. Lewis Bamber—to the address given on the prospectus. It has been returned by the Post Office, marked "Gone away." The "Consulting Engineers," Calder Anderson, Ltd., also had a copy sent to 40, Tower Street. It has been returned, marked "Not known."

Increasing the Flexibility of a Gas-Making Unit.

One of the main points to be considered when installing a plant for the manufacture of gas is that of flexibility. It is necessary nowadays to supply gas of a constant calorific value; and the greater the capacity of the plant for meeting fluctuations in load, and at the same time for maintaining a definite thermal content in the gas produced, the greater is its utility from the main aspect—that of economy. Previous investigations have shown that the flexibility of a setting of vertical retorts can within limits be increased by steaming; but these limits are narrow. In cases where there are marked fluctuations in the demand for gas, it has often been necessary to instal blue or carburetted water gas plant as an auxiliary. Often this additional plant has been used at intervals too far apart to give a commensurate return on the capital expenses, depreciation, and running costs. Bearing this in mind, Mr. Samuel Tagg, of Preston, when he was President of the Institution of Gas Engineers in 1924, suggested that experiments should be carried out on the injection of gas oil into retorts during carbonization. The Fuel Research Board acted on this excellent suggestion, and have now published a report dealing with the results of their investigation. An abstract of this report is given in this issue of the "Journal."

Results of the Investigation.

As the outcome of the work undertaken by the Board, it is shown that an increase is attainable in gas yield (of 520 B.Th.U. per c.ft.) from 15,600 c.ft. with 5 p.ct. steaming to 18,180 c.ft. with 20 p.ct. steaming and with the injection of oil at the rate of 7·13 gallons per ton of coal. What does this mean when the throughput of the retorts is 100 tons per day? It means a flexibility of over 250,000 c.ft. per diem. The im-

portance of this will be realized at once. The possibilities of the process have been demonstrated. The economic aspect has yet to be considered. A balance has to be struck between the additional cost of carbonization due to the oil *plus* the increased fuel required for the setting, and the amount of revenue derivable from the increased yield of gas *plus* the total of the various extra charges brought in had it been necessary to instal a carburetted water gas plant to cope with fluctuations in gas demand. The whole question is one of great interest, and doubtless further investigation into the subject will be made.

Road Openings and Public Utility Companies.

The Borough Engineer and Surveyor of Camberwell (Mr. William Bell) would like to set a serious limitation to the services of public utility companies, who are not in the habit of opening roads for the mere fun of the thing. As a matter of fact, the more expensive road work becomes, the stronger the reason (the companies find) that roadways should not be opened more frequently than is imperatively necessary; and this fact has operated in the direction of such companies exercising the greatest care and discretion. In a paper read last week before the Metropolitan District of the Institution of Municipal and County Engineers, Mr. Bell advocated that as the Ministry of Transport called upon local authorities to submit their road work programmes, so the Ministry should be empowered to make a similar call on public companies. In his opinion, no company should be allowed to open newly paved roads under five years after completion, instead of one year—emergencies excepted. "Surely," he said, "we are entitled to expect more than one year's life out of any permanently paved road before it is hacked about again." He also suggested that the Ministry of Transport would do well to convene a conference of the various local authorities, with a view to formulating a uniform scheme and programme of road construction in the Metropolis. The latter suggestion is all very well. Regarding the former, Mr. Bell should have a year or two in the distribution department of a public utility company; and he would then learn something of the difficulties involved in such public service.

Labour and Communism.

At the Liverpool Conference of the Labour Party last week, the Communists found that their power instead of being in the ascendant is standing still, if not on the wane. The real leaders of the trade unions showed in decisive fashion that they now intend to be masters in their own houses—houses which they were largely instrumental in constructing, but into which disturbers of the peace have found entry, and have attempted to rule, and promote discord, in order to get their fanatical and fantastical doctrines accepted by the rank and file. However, communism in this country had a distinct set-back at the conference. The followers of the hotheads and firebrands will now see that these new "leaders" have gone too far and too violently to work, and that the genuine leaders have now been stirred to repellent activity. After the foolish week-end tirades to which the country has been treated of late by the Secretary of the Miners' Federation, it was refreshing to find Mr. Herbert Smith, the President of that body, saying in a few straight words to the communists: "If we talk less about fighting, and do more thinking, we will get reform much easier." Broadsides into the "Red" camp were also delivered by the Chairman of the Conference (Mr. C. T. Cramp), Mr .Thomas, Mr. Arthur Henderson, and many other well-known and tried leaders of labour. Among other declarations by Mr. Cramp in his address was this notable one, which has been quoted by almost every newspaper in the country: "I believe the position of those who would apply methods of force to the affairs of this highly developed Capitalist State, with its huge population, and its present inability to feed its people, is a position very much the reverse of 'advanced'—is, in fact, about one hundred years behind the times, and should be scrapped as antiquated and out-of-date."

Lighting in Rural Areas.

In other columns this week, we give extracts from the paper which Mr. E. C. Lennox read at the recent meeting of the Institution of Public Lighting Engineers. It dealt with electric street-lighting in rural areas; but it will be found that there are many points in the fore part of the contribution which can be applied equally to lighting by gas as to lighting by electricity. The reproduced portions of the paper which deal with electric lighting in rural areas will, in our opinion, be useful to gas managers who are considering the position of their undertakings when in competition with electricity for such business. It is always well to have a good knowledge of the position and qualifications of one's competitor. It makes things much easier in bringing about a determination as to what must be done to secure a contract. The author of the paper, being the Assistant Engineer to the Lighting and Heating Company of the County of Durham Electric Power Distribution Company, is a good authority on the subject of which he treats.

PERSONAL.

Mr. JOSEPH WATSON last week retired from the Secretaryship of the Featherstone, Ackworth, Purston, and Sharlston Gas Company, after fifty years' service, and takes a seat on the Board of Directors. He is succeeded by Mr. T. WALLER, a former Director. Mr. Watson will receive a pension, in addition to his fees as a Director, in appreciation of his long service to the Company. At the annual meeting of shareholders he was presented with a handsome double settee.

OBITUARY.

The death has taken place suddenly of Mr. P. J. FITZPATRICK, Manager of the Drogheda Gas-Works. He was a native of Cahir, and went to Drogheda six years ago, previous to which, among other appointments, he had been for thirteen years Manager of the Maryborough Gas-Works. He was President in 1914 of the Irish Association of Gas Managers, and was present at the Belfast meeting of the Association last month.

The death took place, on the 3rd inst., suddenly, of heart failure, of Captain H. RIALL SANKEY, C.B., C.B.E., R.E. (retired), M.Inst.C.E., M.Inst.Mech.E., in his 72nd year. He was connected in important capacities with a number of Companies—including Marconi's Wireless Telegraph Company—and was a member of several Committees dealing with civil and mechanical engineering, particularly subjects relating to internal combustion engines, in which connection his name was well known to our readers. In the Army, from which he retired in 1889, he did much outstanding engineering work.

Mr. JOHN BRITTON, whose death has occurred at the age of 79, went to York from Tockwith in 1860, and entered the employ of the York Gas Company. He served the Company in various capacities for the long period of 65 years.

A figure well known to a very large number of gas managers passed away suddenly on Tuesday, Sept. 29, in the person of Mr. JOE NORTHROP, who had been in the employ of Messrs. Drakes Limited as a retort setter since May, 1874—thus completing 51 years' continuous service. There were few gasworks in the country that he had not visited at one time or another in the course of his employment. He was of a genial disposition, and was ever ready with a cheery word.

Gas in a Wire Mill.

The use of gas in a wire mill is described by Mr. J. M. Layng, of the Stewart Hartshorn Company, Newark (N.J.), in the pages of the "Iron Age." The Company manufacture high-grade tempered window-shade wire, as well as other ranges of wire, to exacting requirements. When the plant was designed, coke was employed as a fuel in the operations of annealing, baking, patenting, and tempering units. Producer gas, believed to be superior to coke, was used next; and this, after many years of working, was replaced by electrically operated furnaces. The last-named method unquestionably resulted in a product of excellent quality; but its prohibitive cost led to its abandonment. Now all furnaces, such as open annealing, pot annealing, baking, patenting, and tempering, have been re-designed and converted by the Surface Combustion Company to the use of town gas; and this has proved more satisfactory than all methods employed heretofore. The new furnaces have been installed for several months, and have demonstrated that the savings estimated are being achieved. All furnace temperatures are recorded by means of remote and central recording and indicating systems of temperature regulation, with the equipment housed in a separate pyrometer room away from the fumes and dust of the mill. Open-hearth annealing is used for incoming wire rod and subsequently annealing of the drawn wire. The charge of wire coils is heated to 1200° or 1400° Fahr., depending upon the nature of the material treated. After the wire has been pickled, it is washed and lime-coated, and taken to the bake oven, which is maintained at a fairly uniform temperature of about 300° to 400° Fahr. The other processes in which gas is used are also described.

PERCENTAGE OF CARBON MONOXIDE IN MIXTURES OF COAL GAS AND WATER GAS.

Compiled by F. E. Mills, B.Sc., A.M.I.Chem.E., from Mr. W. J. A. Butterfield's formula:

$$\text{P.ct. CO} = \frac{8C + (42 - 4X)W}{100}$$, where C = P.ct. coal gas, W = P.ct. water gas, X = Gallons oil per 1000 c.ft.

P.Ct. C.W.G. (W.)	Gallons of Oil per Thousand (X).										
	0·0	0·2	0·4	0·6	0·8	1·0	1·2	1·4	1·6	1·8	2·0
0	8·00										
1	·34	8·33	8·32	8·32	8·31	8·30	8·29	8·28	8·28	8·27	8·26
2	·68	·66	·65	·63	·62	·60	·58	·57	·55	·54	·52
3	9·02	9·00	·97	·95	·92	·90	·88	·85	·83	·80	·78
4	·36	·33	9·30	9·26	9·23	9·20	9·17	9·14	9·10	9·07	9·04
5	·70	·66	·62	·58	·54	·50	·46	·42	·38	·34	·30
6	10·04	·99	·94	·90	·85	·80	·75	·70	·66	·61	·56
7	·38	10·32	10·27	10·21	10·16	10·10	10·04	·99	·93	·88	·82
8	·72	·66	·59	·53	·46	·40	·34	10·27	10·21	10·14	10·08
9	11·06	·99	·92	·84	·77	·70	·63	·56	·48	·41	·34
10	·40	11·32	11·24	11·16	11·08	11·00	·92	·84	·76	·68	·60
11	·74	·65	·56	·48	·39	·30	11·21	11·12	11·04	·95	·86
12	12·08	·98	·89	·79	·70	·60	·50	·41	·31	11·22	11·12
13	·42	12·32	12·21	12·11	12·00	·90	·80	·69	·59	·48	·38
14	·76	·65	·54	·42	·31	12·20	12·09	·98	·86	·75	·64
15	13·10	·98	·86	·74	·62	·50	·38	12·26	12·14	12·02	·90
16	·44	13·31	13·18	13·06	·93	·80	·67	·54	·42	·29	12·16
17	·78	·64	·51	·37	13·24	13·10	·96	·83	·69	·56	·42
18	14·12	·98	·83	·69	·54	·40	13·26	13·11	·97	·82	·68
19	·46	14·31	14 16	14·00	·85	·70	·55	·40	13·24	13·09	·94
20	·80	·64	·48	·32	14·16	14·00	·84	·68	·52	·36	13·20
21	15·14	·97	·80	·64	·47	·30	14·13	·96	·80	·63	·46
22	·48	15·30	15·13	·95	·78	·60	·42	14·25	14·07	·90	·72
23	·82	·64	·45	15·27	15·08	·90	·72	·53	·35	14·16	·98
24	16·16	·97	·78	·58	·39	15·20	15·01	·82	·62	·43	14·24
25	·50	16·30	16·10	·90	·70	·50	·30	15·10	·90	·70	·50
26	·84	·63	·42	16·22	16·01	·80	·59	·38	15·18	·97	·76
27	17·18	·96	·75	·53	·32	16·10	·88	·67	·45	15·24	15·02
28	·52	17·30	17·07	·85	·62	·40	16·18	·95	·73	·50	·28
29	·86	·63	·40	17·16	·93	·70	·47	16·24	16·00	·77	·54
30	18·20	·96	·72	·48	17·24	17·00	·76	·52	·28	16·04	·80
31	·54	18·29	18·04	·80	·55	·30	17·05	·80	·56	·31	16·06
32	·88	·62	·37	18·11	·86	·60	·34	17·09	·83	·58	·32
33	19·22	·96	·69	·43	18·16	·90	·64	·37	17·11	·84	·58
34	·56	19·29	19·02	·74	·47	18·20	·93	·66	·38	17·11	·84
35	·90	·62	·34	19·06	·78	·50	18·22	·94	·66	·38	17·10
36	20·24	19·95	19·66	19·38	19·09	18·80	18·51	18·22	17·94	17·65	17·36
37	·58	20·28	·99	·69	·40	19·10	·80	·51	18·21	·92	·62
38	·92	·62	20·31	20·01	·70	·40	19·10	·79	·49	18·18	·88
39	21·26	·95	·64	·32	20·01	·70	·39	19·08	·76	·45	18·14
40	·60	21·28	·96	·64	·32	20·00	·68	·36	19·04	·72	·40
41	·94	·61	21·28	·96	·63	·30	·97	·64	·32	99	·66
42	22·28	·94	·61	21·27	·94	·60	20·26	·93	·59	19 26	·92
43	·62	22·28	·93	·59	21·24	·90	·56	20·21	·87	·52	19·18
44	·96	·61	22·26	·90	·55	21·20	·85	·50	20·14	·79	·44
45	23·30	·94	·58	22·22	·86	·50	21·14	·78	·42	20·06	·70
46	·64	23·27	·90	·54	22·17	·80	·43	21·06	·70	·33	·96
47	·98	·60	23·23	·85	·48	22·10	·72	·35	·97	·60	20·22
48	24·32	·94	·55	23·17	·78	·40	22·02	·63	21·25	·86	·48
49	·66	24·27	·88	·48	23·09	·70	·31	·92	·52	21·13	·74
50	25·00	·60	24·20	·80	·40	23·00	·60	22·20	·80	·40	21·00
51	·34	·93	·52	24·12	·71	·30	·89	·48	22·08	·67	·26
52	·68	25·26	·85	·43	24·02	·60	23·18	·77	·55	·94	·52
53	26·02	·60	25·17	·75	·32	·90	·48	23·05	·83	22·20	·78
54	·36	·93	·50	25·06	·63	24·20	·77	·34	23·10	·47	22·04
55	·70	26·26	·82	·38	·94	·50	24·06	·62	·38	·74	·30
56	27·04	·59	26·14	·70	25·25	·80	·35	·90	·66	23·01	·56
57	·38	·92	·47	26·01	·56	25·10	·64	24·19	·93	·28	·82
58	·72	27·26	·79	·33	·86	·40	·94	·47	24·21	·54	23·08
59	28·06	·59	27·12	·64	26·17	·70	25 23	·76	·48	·81	·34
60	·40	·92	·44	·96	·48	26·00	·52	25·04	·66	24·08	·60
61	·74	28·25	·76	27·28	·79	·30	·81	·32	·94	·35	·86
62	29·08	·58	28·09	·59	27·10	·60	26·10	·61	25·21	·62	24·12
63	·42	·92	·41	·91	·40	·90	·40	·89	·49	·88	·38
64	·76	29·25	·74	28·22	·71	27·20	·69	26·18	·66	25·15	·64
65	30·10	·58	29·06	·54	28·02	·50	·98	·46	·94	·42	·90
66	·44	·91	·38	·86	·33	·80	27·27	·74	26·22	·69	25·16
67	·78	30·24	·71	29·17	·64	28·10	·56	27·03	·49	·96	·42
68	31·12	·58	30·03	·49	·94	·40	·86	·31	·77	26·22	·68
69	·46	·91	·36	·80	29·25	·70	28·15	·60	27·04	·49	·94
70	·80	31·24	·68	30·12	·56	29·00	·44	·88	·32	·76	26·20

Note.—The above formula and table assume coal gas 8 p.ct. CO, blue water gas 42 p.ct. CO, and that 1 gallon of oil gives 95 c.ft. of oil gas free from CO, or 100 c.ft. with 2 p.ct. CO. Any gas obtained—*e.g.*, by steaming or "pulling"—in excess of 12,700 c.ft. per ton of coal is to be regarded as water gas. It is also to be noted that gas from Scotch coals commonly contains more than 8 p.ct. CO.

THE COKE COMPETITION.

AWARDS AND REPORT OF THE COMMITTEE.

The Adjudicating Committee appointed to consider, and allocate awards for, the papers submitted in the Coke Competition (as announced in the "Gas Journal" for Feb. 18 last) have pleasure in reporting their decisions as follows:

SECTION I.—AWARDS.

Awards.	Nom de Plume.	Name.
First Prize £200	"Lux ex Tenebris"	The Research Section of the Woodall-Duckham Companies, 52, Grosvenor Gardens, London, S.W. 1.
Second Prize £100	"J.E.B."	Mr. Michael Barash, 35, Central Road, West Didsbury, Manchester. (West's Gas Improvement Company.)
Third Prize £50	"Phalidon"	Mr. Laurence Henry Sensicle, B.Sc. (Hons.), F.I.C., F.C.S., "Northmere," Pelton Fell S.O., Co. Durham.
Fourth Prize £25.	"High Low Game"	Mr. Herbert John Toogood, "The Poplars," Elland, Yorks.
Fourth Prize £25.	"Thesaurus"	Dr. W. B. Davidson, Warkworth House, Tynemouth, North Shields.
Fifth Prize £15	"Fuel"	Mr. Norman J. Ivison, B.Sc.(Lond.), 24, Beaconsfield Street, Newcastle-upon-Tyne.
£10	"Eliya"	Mr. W. W. Townsend, General Manager and Engineer, Colchester Gas Company.
£10	"Jovax"	Mr. Donald Bagley, 92, Victoria Street, Westminster, S.W. 1.
£10	"Reformare"	C. Buchholz, Dammstrasse 73, M. Gladbach, Germany.

Rejected: "Camborne," "Clarence Bell," "Cocoanut," "Fuinery," "Nemo," "Thistle."

SECTION II.—AWARDS.

Awards.	Nom de Plume.	Name.
First Prize £100	"Labetur in Omne Volubilis Ævum"	Mr. Falconer M. Birks, 5, Beckton Gardens, Beckton, E. 6.
Second Prize £50	"Carbon"	Mr. Rupert Kennedy Stockwell, M.A.S.C.E., M.A.I.M.E., Assoc I.M.M., Magnet House, Kingsway, London, W.C. 2.
Third Prize £25	"Southron"	Mr. S. E. Whitehead, B.Sc.Eng., Assistant Engineer, Portsea Island Gas Light Company, and "St. Heliers," Burrill Avenue, Cosham, Portsmouth.
£10	"Cocoanut"	Anonymous [Rule 7].
£10	"One Step"	Mr. Herbert John Toogood, "The Poplars," Elland, Yorks.
£10	"Propeller"	C. Buchholz, Dammstrasse 73, M. Gladbach, Germany.
£10	"Rexat"	Mr. Andrew Baxter, Birmingham Gas Department, Engineer's Office, Saltley, Birmingham.
£10	"Thistle"	Mr. Herbert B. Holliday, Assistant Engineer, Borough of Wallasey Gas and Water Department, Limekiln Lane, Wallasey.

Rejected: "Camborne," "Early Dalton," "Eliya," "Fuinery," "Nemo," "Practical Observer," "Summa."

SECTION III.—AWARDS.

Awards.	Nom de Plume.	Name.
First Prize, £100	"Inconnu"	Mr. F. H. Arms, "Trouville," Solihull Lane, Robin Hood, Birmingham.
Second Prize, £50	"Thermopolitan"	Mr. E. W. L. Nicol, Assoc.I.C.E., A.M.I.E.E., M.I.Mar.E., Peak View, Canonbie Road, Honor Oak, S.E. 23.
Third Prize, £30	"F.W.S."	Mr. F. W. Smelts, British Columbia Electric Railway Company, Carrall and Hastings Streets, Vancouver, B.C.
£10	"Ailean"	Mr. James M. A. Mitchell, 76, Dilston Road, Newcastle-upon-Tyne.
£10	"Cocoanut"	Anonymous [Rule 7].
£10	"Cokalition"	Mr. Harold Meadows Dodimead, 1, Mountolieu Gardens, Putney, S.W. (Gas Light and Coke Company, Horseferry Road).
£10	"Comfort and Economy"	Mr. Geoffrey George Champion, 8, Brookview Road, Streatham, S.W. 16, and Mr. Robert George Minnion, 60, Stanley Road, Woodford, E. 18.
£10	"Co-Partner"	Mr. Edward Frost Keable, Engineer, Manager, and Secretary, Gorleston and Southtown Gas Company.
£10	"Dante"	Mr. H. J. Hodsman, 2, Norwood Grove, Victoria Road, Hyde Park, Leeds.
£10	"Eureka"	Mr. Wilfred Hanson, "Ashleigh," Daverley Road, Elland, Yorks.
£10	"Non Multum Sed Utile"	Mr. S. Qvarfort, Warta Gas Works, Stockholm 5, Sweden.
£10	"Open Sesame"	Mr. Herbert John Toogood, "The Poplars," Elland, Yorks.
£10	"Optimist"	Mr. P. E. Knight, 14, Pier Road, Erith, Kent.
£10	"Publicity Pays"	Mr. W. H. Becket, 15, The Square, Carshalton, Surrey.
£10	"Tem"	Mr. Jos. C. Taylor, "Rodmersham," 7, Albert Road, Hendon, N.W. 4 (Gas Light and Coke Company, Horseferry Road).
£10	"Vera Pro Gratiis"	Dr. W. B. Davidson, Warkworth House, Tynemouth, North Shields.

Rejected: "Camborne," "Enterprise," "Fuinery," "Murdoch," "Nemo I.," "Nemo. II.," "Orico," "Polmy," "Practical Observer," "Sapper," "Stemfluote."

NOTES ON THE AWARDS.

The Committee desire to say that the awards were made precisely in accordance with the conditions and directions laid down in the "Journal" for Feb. 18. Every paper was read individually, and apart, by the three members of the Committee, who each (without consultation with his colleagues) made his own selection as to the order of merit, with, before him, only the distinguishing pen names upon the contributions. It is a satisfaction to be able to state that the individual selections as to order of merit were in such close agreement that the awards are the result of a unanimous decision. Not until the whole of the awards in the three sections had been made by the Committee in joint consultation were the envelopes opened which revealed the names of the contributors.

In Section I.—Coke Production—fifteen papers were submitted. Nine obtained awards, and six were rejected.

In Section II.—Coke Preparation, Handling, &c.—fifteen papers were submitted. Eight obtained awards, and seven were rejected.

In Section III.—Sales and Utilization of Coke—twenty-seven papers were submitted. Sixteen obtained awards, and eleven were rejected.

Regarding the sequence of the papers which receive the £10 awards (this applies to all three Sections), the contributions have not been placed in any order of merit, but alphabetically, according to the initial letter of the *nom-de-plume*. This course was taken as a difficulty was found, through the variety of meritorious points in the papers, in assigning precedence to certain of them—the matter in one being fairly balanced by suggestions and thought in others.

As originally announced, the prizes to be awarded were as follows:

Section I.

First Prize	£200
Second Prize	75
Third Prize	50
Twelve Prizes of	10 each

Section II.

First Prize	£100
Second Prize	50
Third Prize	25
Ten Prizes of	10 each

Section III.

First Prize	£100
Second Prize	50
Third Prize	25
Ten Prizes of	10 each

It will be remembered that Rule 9 was as follows:

Should there be no papers submitted of merit adequate to justify the prizes in accordance with the scheme, the Committee reserve to themselves the right to withhold any allocation. Should, also, the number of papers submitted of real merit not reach the number provided for in the scheme of prize distribution, they will only allocate prizes to the extent to which they are justified in doing so. It is, however, hoped that there will be no need to take advantage of this protective rule.

This rule gave the Committee plenary power in the matter of the allocation of prizes; but, *prior to opening the envelopes containing the names of the competitors*, the Committee sought, and obtained, the consent of the Woodall-Duckham Companies (whose generosity provided the £1000 for the Competition) to use discretion in making upward changes in the values of some of the awards. It was the view of the Committee that there was such merit in certain of the papers as to justify them in showing special appreciation of the value of the contributions. This applies in the first place to the paper to which they awarded second prize in Section I.; and they marked their approval by increasing the amount from £75 to £100. For a similar reason, they created in the same Section two fourth prizes of £25 each; and a fifth prize of £15. Of the twelve prizes of £10, only three were awarded in that Section.

In Section II., in addition to the first three prizes, only five £10 prizes were awarded.

In Section III., to emphasize their appreciation of the paper which gained the third award—not because the suggestions are all applicable to this country, and, for financial reasons, one at all events could not be, but because of the thoroughness with which in Vancouver the coke market has been developed, and therefore is a pattern in enterprise and energy—the prize was increased from £25 to £30. The addition is not large; but it was made purely to accentuate the appeal which this paper made separately to the three judges, as was evidenced when they came to compare their notes. In this Section, the Committee also increased the number of £10 awards to thirteen, in lieu of the ten originally named.

It will therefore be seen from the first tabulated statement that, from the £1000 placed at the disposal of the Committee, awards were made totalling in Section I. to £445; in Section II. to £225; in Section III. to £310—together £980. The awards will be distributed in the course of a few days, and thereafter the Committee will return to the Woodall-Duckham Companies the balance of the fund.

GENERAL COMMENTS.

The Committee desire to congratulate the winners of the chief awards upon their meritorious productions, and to express the opinion that notable contribution has been made to the literature of coke manufacture and disposal, which should be incentive and guiding to the gas industry.

There is no intention in this report to extract the teachings of the papers. The principal winning ones will be published. Readers will thus be able on their own account to draw from them their lessons. But it is understood that some of the more outstanding features of the papers will be the subject of comment at, or near to, the time of their publication. The Committee, however, would like to point out one or two matters which have particularly impressed them.

There is the almost uniform belief of writers in Section III. that the future of gas coke in this country depends very largely upon quality—not only in respect of ash and moisture, but structurally—with proper grading for the purposes to which it is to be applied. Quality is a matter which falls into consideration in Section I.; and so there can be traced a striking affinity between the views of contributors in Sections I. and III.—contributors working in totally different spheres in the industry.

There is no question that coal charges for carbonization will, if we are to make real progress in the matter of coke, have to receive greater investigation. The scientific information now available points to the utilization of mixtures of coking and non-coking coals in proportions determined by ascertained characteristics. Some gas engineers dismiss the idea as being little short of absurd, thinking the expense of blending prohibitive. The Committee fear that such judgment is not supported by evidence or sufficient consideration. It is a matter for careful investigation, and not dismissal without it; for much is involved in the future of the gas industry in respect of coke. Admitting that the blending of coals in properly determined proportions does cost money, there are no definite data at hand from within the gas industry as to that cost; there are no data as to whether there are compensations to be derived from economies and higher efficiencies; but there is this certainty—that the loss of custom for gas coke costs money and lowers values. If we can obtain and maintain permanent custom equal to our coke output, so producing a larger revenue, including better prices for the higher intrinsic value of the coke as indicated by the papers in Section I., then there is something to be said for expending money on obtaining greater security and constant markets for coke.

Another consideration is that the very means that are suggested for the improvement of gas coke are applied in the coke-oven industry. While some gas men are, without investigation and consideration, adopting a *non possumus* attitude, the coke-oven industry is up and doing; and its coke has already entered the domestic and other markets which were once regarded as the provinces solely of gas coke. There are further the strenuous efforts that are being made to establish low-temperature coke as a domestic fuel. Attention must not be refused to what is transpiring in that direction. There is, however, evidence to-day that physical structure produced by blending is as important in coke as a larger percentage of retained volatile matter.

The Committee express no positive opinion on these matters; but they consider that the winning papers in Section I., read in conjunction with those in Section III., are directional, and urge that the gas industry should, in the interests of its chief secondary product, and those of the net cost of the primary product into the holder, and therefore of the development of the business in the primary product, concentrate on this question of the economics of blending coals in proportions determined by the investigation of the chemical and physical characteristics of the coal to be carbonized. In this, as other matters, advance cannot be made without research—in the laboratory, and on a working scale.

One other point regarding Section I. The best papers came from the contractors for coal-carbonizing plants, competitors believed to be associated with coke-oven plants, and scientific workers. The competition was thrown open to the whole world interested in the production and sale of coke, and that was the reason why a perfectly distinterested Committee were appointed for adjudication purposes, and safeguards formulated so that no one who desired to compete should be excluded, and no charge of favour or partiality could be levelled against the Committee. The Committee congratulate the Research Staff of the Woodall-Duckham Companies upon being the winners of the chief award; and, singularly, it will be seen that a gentleman associated with West's Gas Improvement Company has captured the second prize in the same Section. Near the top of the tree, too, comes a gentleman whose name is well known in connection with Messrs. Robert Dempster & Sons, Ltd. There is a significance about the sources of these highly placed papers of which the Council of the Institution of Gas Engineers should make note.

In connection with Section I. the Committee started the in-

vestigation of the papers with originality and practicability well before them. As, however, the papers were studied, suggestiveness came prominently to the fore; practicability it was found was a question for thorough exploration. In Section II., however, originality and suggestiveness were not strikingly prominent features. Where novel suggestion is put forward, practicability again must rely upon investigation. Speaking generally, the papers in Section II. were disappointing; being largely a portrayal of present practices, with individual choice of plant. In Section III. a great deal appears in the papers that is not new; but combining them, there is a good harvest of experience and suggestion which should be valuable in developing the coke business. Traceable in many of the papers is the request, "Give us the quality and suitable grading, and we will do the business." The domestic coke-heated water-boiler is a first favourite for development. Some writers advocate special grates for gas coke for room heating, ignoring capital cost and the millions of grates in existence capable of receiving more coke (given suitable characteristics) than the gas industry is likely ever to produce within our time. Others ask for a coke of quality and preparation which will burn in any grate. That is the demand; it is the desideratum. Can it be gratified? The contributors in Section I. indicate that it can be. The Committee repeat that affirmation or refutation should be sought by a concentrated exploration by the gas industry, to which the question of coke is to-day of great importance. The competition will fail in its purpose if it does not give (as it should do if the results are properly utilized) a valuable lead.

Signed by the Committee:

A. W. Smith,
General Manager and Secretary,
Birmingham Corporation Gas Department.

W. B. Leech,
Engineer of the Beckton Works of
the Gas Light and Coke Company.

Arthur F. Bezant,
Editor of the "Gas Journal."

Sept. 30, 1925.

ELECTRICITY SUPPLY MEMORANDA.

The ladies take a great share in controlling our everyday affairs. They have an influence which sometimes cannot be resisted, though, on reflection, we have to admit that there is not always reason in what they do or urge. Now they have got a footing and hearing in the larger matters of life, and, through their votes, they have political weight.

The Ladies Advise the Government.

We hope those who represent them in Parliament, and the ladies who have seats in that assembly, will ever use their power with discretion, and be sure of the ground upon which they stand before they make a move. If, however, they are guided by a resolution submitted at a conference of the National Council of Women in Great Britain, which recently met in Birmingham, we are afraid they will go very much astray. The National Council of Women in Great Britain appear to have been captured by those who preach the gospel of universal electricity supply, while keeping silent on the grave national waste and uneconomy that would ensue, and the domestic ruin that would result if people were so foolish as generally to adopt electricity for all purposes of light and heating. The resolution that was passed by the Council of Women urged upon the Government the importance of developing a comprehensive electrical scheme for the whole country, which (they said) would, while eliminating waste, stimulate industry and afford domestic light and heat for towns and villages, as well as help to abate the smoke nuisance—thus adding to the efficiency and health of the nation.

What Do the Ladies Mean?

What do the ladies mean by "eliminating waste?" Perhaps they do not know anything of the truth that, of every ton of coal used in electricity generation, about 82 p.ct. of the thermal energy is lost in the very best electricity stations of the country, and 90 p.ct. and over in many others. Perhaps they will not take us as safe guides in this matter; and so they had better refer to the data issued on the subject by the Electricity Commissioners. We do not call that condition of things "eliminating waste;" rather we should say that it is promoting waste—especially when the current is used for heating in domestic or industrial operations. Then how is such dearly purchased energy going to stimulate industry? Of course, it is not supposed that the ladies know a great deal about works' costs, and how small a proportion of the total power represents. Perhaps they will be interested in this paragraph quoted by the "Electrical Review" from the "Electrical World":

> Power salesmen are often confronted with the statement by a prospective customer that the power rate is too high. An effective answer to this objection has been found by many salesmen in the statement that the cost of power is a very small percentage of the total manufacturing cost, whereas the many desirable and valuable features of purchased power make its use an important advantage to a manufacturer. The relation of power costs to the total manufacturing cost in specific industries is frequently helpful in convincing a prospective power user. A recent study of power cost and its relation to total manufacturing costs of twenty-one industrial power users showed that, with very few exceptions, the cost of power was less than 3 p.ct. of the average manufacturer's production expenses.

The ladies might affix that paragraph to their resolution when forwarding it to the Government. There is not the slightest chance of any development the Government could bring about in industrial areas causing the cost of current for power to be any cheaper than it is to-day; on the contrary, by extending transmission to rural areas in which there is small custom, the chances are that the expense of electrical energy to industry will have to ascend in order to meet the expenses of taking-on less profitable supply, with the inseparable losses *en route*. Again, the ladies talk of using electricity in the home for heating by this dearly produced energy. Do they really know what it means in expenditure on electricity for the normal heating required in any household? We doubt whether they do; but they may be assured that even the wage-earners would require from the Government a good "dole" in order to pay their electricity account for heating. A more economical system of heating is by gas; but the National Council of Women in Great Britain—perhaps unintentionally—are unfair to the gas industry and to national and domestic economy in failing to recognize the fact. Obviously their knowledge is at fault. They have swallowed the electrical bait, without inquiring into the fundamental facts. We hope they will go into these, and compare gas and electricity on a proper basis, before they again take such a step in the dark as they did at the Birmingham Conference.

"Meteor's" Grumbles.

Our friend "Meteor" of the "Electrical Times" sometimes gets into a gloomy and complaining state. Everything appears to be wrong. In his notes on the 24th ult. he was full of grumbles. He has an impression that the Institution of Public Lighting Engineers is becoming dominated by the gas interests. "The Times" ought to be jumped upon for giving only a paragraph to the death of three people in Belfast through suffocation by escaping gas, while when a fireman is killed by his helmet coming into contact with a live electric wire a long report is published. Of course, when people smell gas, and do not take steps to produce correction, they place themselves *vis-à-vis* with serious risks. A fireman or any other person has no indication of the presence of leaking electricity which may cause him to pass from life into death without the slightest warning or opportunity to take the necessary steps for self-preservation. There we have an important difference which cannot be ignored. In another paragraph, "Meteor" gave a little lashing to those people who seek advice gratis which should be obtained through a consulting engineer. They deserve chastisement. So there we are in agreement with our friend.

Institution of Public Lighting Engineers.

Now about the Institution of Public Lighting Engineers becoming dominated by the gas interests. If it was the other way about and electricity was top dog in the new organization, "Meteor" would have sung a Pæan in the privacy of his office, and not a word would have escaped him in print. As a matter of fact, however, we have never known an Institution in which, during the general proceedings, the balance between two interests is held more fairly, and, indeed, in which an effort has been made to deal with public lighting from the point of view of making the best possible use of the agents at command. Public lighting engineers should be free from bias so far as the agents are concerned, and should do the best possible to realize for the ratepayers efficiency with economy. Let us reflect. At the Glasgow meeting electricity had a splendid innings; at Leeds, the Presidential Address of Mr. Shapley was a model of impartiality, and there was a paper on electric lighting which exceeded the dimensions of the one on gas lighting. We have not noticed a similar complaint by "Meteor" regarding the Illuminating Engineering Society. The Society offers a common platform for the discussion of scientific and practical problems relating to illumination; but are electrical or gas men the dominating party in that organization? The answer is not a difficult one. Just one other gem from the sarcastic "Meteor": "We all know the thrilling existence of gas men's societies, and gas men's literature, admired and absorbed only by their noble selves." "What a life!" exclaims "Meteor." "What a little mind!" say we. It is quite refreshing to turn from our peevish contemporary to the "Electrical Review," which says: "The Institution of Public Lighting Engineers held a very suc-

cessful conference at Leeds last week, and may be regarded as fairly launched on a career of usefulness."

An Autocratic Trade Union.

When the tenant of a house demands a supply of gas or electricity, the supplying authority are compelled by law to furnish him with it, unless the applicant has transgressed in a way which enables the supplier to refuse the request. Neither labour difficulties nor by-laws (unless the latter are specifically statutorily empowered) can override the general law. If they could, we should speedily get into a nasty mess between consumers and public services. We see that the St. Helens Corporation have in hand a case somewhat analogous to the one in which the Hackney Council were involved some time ago, and which led to an appeal to the High Courts, with the result that the Council did not succeed. That was a case in which a house was wired by non-union labour, and the Union employees of the Council declined to connect up the supply, and threatened that, if it was done by non-union labour, they would call out the men, and so stop the service. The Council lost. Their duty was to supply the applicant. Two residents have summoned the Corporation of St. Helens for failing to comply with their request for a supply of electricity. One of the plaintiffs—a Mr. Leather—had had his house wired by plumbers who were not members of the E.T.U.; and the Union jointers employed by the Corporation refused to connect the house to the mains. Plaintiff naturally said that any difficulty there was between the Corporation and their men had nothing to do with him. The Corporation in their defence stated that the District Secretary of the E.T.U. had written to say that, if the house was connected up, the forty Union men employed by the Corporation would cease work, and would be supported by 150 other E.T.U. men. In this way the public supply of electricity would be stopped. The Magistrates gave a decision against the Corporation, and a penalty of 1s. a day was imposed. Notice of appeal has been given. It seems to us that what is wanted is an appeal to Parliament to pass legislation to prevent such autocratic action on the part of a trade union, which prevents the fulfilment of the rights of a citizen under the general law. What with trade unions and the Government, the electricity industry looks like being deprived of a substantial part of its autonomy.

"Safety" Items.

The "Electrical Review" reports that at a Ross hotel a laundry maid left an electric iron switched-on at about 8 o'clock one evening. It was still on next morning; but during the night its location had been altered. The iron had burned through a 2-inch table, had dropped right through, and was hanging by the flexible cord. In the next paragraph our contemporary reported the death of the fireman whose helmet came in contact with a live wire when dealing with a fire in Finsbury Street. On the evening of the 22nd ult., Leigh suffered a collapse of its electricity supply. A performance at the theatre had to be abandoned, and even the police station had no respect shown it by the erring current. Such misconduct is beyond the power of the police.

A NOTABLE CONTRIBUTION TO THE CAUSE OF GAS OVEN ECONOMY.

By "Eyewitness."

It is the general experience that progress in the gas industry at large is usually achieved through concentration by various workers at one time on some particular part of the subject. Now vertical retorts are perfected; at another time horizontals are improved. Similarly, on the appliance side, attention is focussed on fires for a year or two; and then water-heaters have their turn.

Lately the gas cooker has held the stage, and the latest—and as its makers, Messrs. R. & A. Main, believe, the best—of the improved appliances put forward as the result of research is the "Conservor" oven.

Foundations of belief have always been of interest to the inquiring mind; and in the case of this oven the array of facts put forward to prove its advantages to all the three parties concerned—the user, the supplier, and the maker—is well worth recapitulation, and will repay study on the part of the user and the supplier. These facts may be summed up in one word—economy. As this must obviously mean different things to the three parties, it may be stated that, for the user, economy means saving in gas, in time, and in attention, and saving in the sense of better cooked and more nutritious and digestible food. In all these meanings of the word economy, the "Conservor" oven fulfils the user's expectations

These desirable results are brought about, say Messrs. Main, by the system adopted of circulating the products of combustion inside the oven, which, by longer and more intimate contact, enables them to give up more of their sensible heat to the food. The circulation at the same time equalizes the temperature, and so makes the whole of the oven space available for cooking. A further advantage is, therefore, that cooking goes on more evenly, and the possibility of the food being burnt is minimized. Finally, heat is further conserved by preventing cold air from being drawn through the cooking space. One practical piece of evidence that all these four advantages are realized is given by Messrs. Main, who say that a Scotch scone may be perfectly baked on the lowest shelf of the "Conservor" oven in less time and with less gas than in an ordinary gas oven of equal size. So much for the user's economy. The supplier—that is, the gas undertaking—interprets economy to mean saving of outlay in first cost, fitting, repairs, and maintenance; and in these respects the "Conservor" oven is confidently advanced as being excellent. There is no call to go into full details of these various points, since in general the "Conservor" oven has exactly the same wearing parts as its parents the "Maintenance" and the "Mainstay" (according as it is a "Maintenance-Conservor" or a "Mainstay-Conservor"); and these two ovens have not only been fully described on previous occasions—for instance, in "The Story of the Mainstay"—but are already well known and appreciated by gas undertakings for their simplicity of construction, sturdiness of build, and interchangeability of parts.

The outstanding virtue of the "Conservor" oven from the gas undertaking's point of view, as given by Messrs. Main, is that, while introducing a new oven principle characterized by all those advantages to the user enumerated above, it keeps strictly within the limits of their already successful system of standardization and interchangeability. For several years—in fact, since their introduction of the original "Maintenance" and "Mainstay" cookers, which started a new era in cooker construction—this has been the firm's settled policy with regard to improvements. The importance of this to the undertakings will be realized with greater force than before, for the "Conservor" unit can now be applied to the very earliest of these cookers without upsetting the scheme of interchangeability of working parts already in operation. Thus all the working parts of a "Mainstay-Conservor" cooker—such as burners, brasswork, grids, bars, gates, &c.—are exactly those of a corresponding "Mainstay;" and therefore any gas undertaking already using a "Mainstay" (or any Main cooker) may now adopt the corresponding "Conservor" type without having to stock any fresh working parts whatever for renewals or repairs, and, to make the story complete, without the new oven in any way interfering with the practical points of dismantling or re-erection already familiar to the undertaking's fitters.

This policy of enabling the advantages of a new invention to be realized at a negligible first cost (for all existing Main cookers may be converted to "Conservors" by substituting the necessary "Conservor" parts for the old parts), and the enormous advantage of not having to stock a completely new range of working parts, is, as the makers remark, thus brought as a new experience prominently before the gas undertakings. They also point out that, while the user and the supplier are thus both benefited, they themselves, as makers, also benefit to the extent that, with the exception of the actual "Conservor" parts, they can continue to use their existing plant for the production of the new cooker. This is where the economy of the third of the three parties is realized.

Thus, as the user and the supplier benefit, so does the maker; and in proportion as he receives benefit, he is progressively enabled to pass it on again in the directions of more expeditious delivery, more reasonable price, or improved appliances to the other two—a concrete example, not of that bane of modern industrial life the vicious circle, but of its converse the beneficial circle.

"Modern Advertising."—This is the title of a new publication from the house of Sir Isaac Pitman & Sons, Ltd. The work is to be completed in twenty fortnightly parts; the first issue appearing to-day. The object of the publication is to provide an authoritative guide to the use of every form of present-day publicity. The first issue contains a foreword by Lord Burnham, and articles on advertising and publicity by writers well qualified to deal with these subjects.

Colombo Gas and Water Company, Ltd.—In the notice of the extraordinary general meeting of the Company (held on Sept. 7) on p. 820 of last week's "Journal," extraordinary resolution A 3, which was confirmed at the meeting, was inadvertently omitted. This resolution reads as follows: "That the regulations contained in the printed document submitted to the meeting, and for the purpose of identification subscribed by the Chairman thereof, be approved, and adopted as the Articles of Association of the Company in substitution for, and to the exclusion of, all the existing Articles thereof."

CENTRAL RESEARCH LABORATORIES OF RADIATION LIMITED.

OPENING CEREMONY.

THE new Central Research Laboratories of Radiation Limited, at Radiation House, No. 15, Grosvenor Place, S.W., had an excellent "send-off" last Thursday, when the formal opening ceremony was performed by Mr. D. Milne Watson, D.L (President of the National Gas Council of Great Britain and Ireland and Governor of the Gas Light and Coke Company), in the presence of a hundred or more guests, representative of all sections of the gas industry in practically every part of the country. Of these new Central Research Laboratories (a detailed description of which will be found below) much is expected; and it appeared to be the unanimous opinion of those who inspected them after the opening that these anticipations will be most amply fulfilled. Briefly, the facts are these: The amalgamation in 1919 of the six firms constituting Radiation Limited resulted in a co-ordination of their laboratory work. The Central Laboratory organization has been in operation since then, and the extension of the activity of this branch has necessitated the equipment of a further department to centralize the research work and separate it from the more routine work of the factory laboratories. In these new Central Laboratories will be carried out investigations of a fundamental nature, which, it is hoped, will lead to that discovery of new facts necessary in certain directions before any further large developments can be made.

Limitations of Works Laboratories.

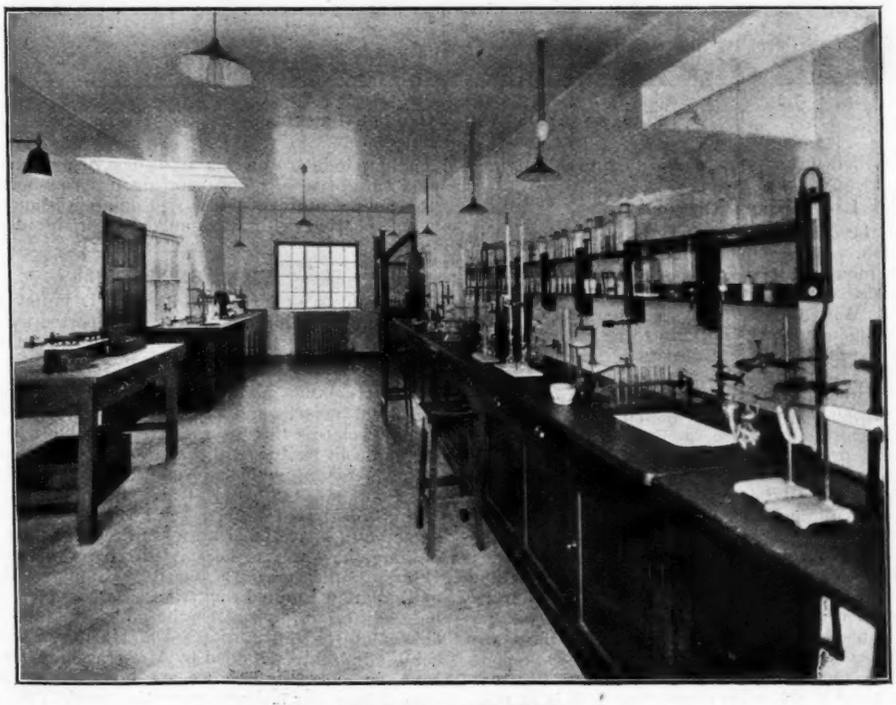
Those who have had experience of works laboratories will readily agree that the scope of the scientific investigation it is possible to carry out in these laboratories is definitely limited. However strong the desire to examine problems which can definitely be classed as research, however keen the wish to eliminate possible errors in chemical, physical, or mechanical testing procedure, practical factors render it extremely difficult—indeed, well-nigh impossible—to bring to a successful termination what be termed pure research. These practical factors are numerous. An undertaking of moderate size must have a laboratory staff to deal with routine tests, but it is seldom that such a concern can afford to set up even a small research department. Salaries, the cost of highly sensitive instruments and delicate apparatus, the running charges—all these, and many other, points have to be considered, and usually prove insurmountable. Even in a fairly large establishment, where perhaps two or three research workers are engaged for the purpose of elucidating particular problems which have been encountered, what usually happens is that from time to time demands of a semi-practical nature are made, which require immediate solution. Those employed in research have to satisfy these demands. The final result is that the research work has to be neglected.

The Question of Capital.

It can be said without any hesitation—and this is not speculative theory, but economic fact—that large capital is necessary to set up a research department which can be relied upon to yield a fruitful return. Messrs. Radiation Limited know this. While, of course, retaining the various laboratories at the works of their constituent firms, they have built and equipped a central research laboratory in Radiation House, No. 15, Grosvenor Place, S.W. 1, which will enable them to pursue necessary investigation of a strictly scientific order. This centralization will tend to bring the right men together, and will allow of freer interchange of ideas.

Determination of Carbon Monoxide.

It is not necessary to outline all the many problems which at present need investigation, but a useful purpose may be served if an indication is given of one or two of them. With the object of providing the quietus for the carbon monoxide bogey which arises from time to time, a special study has been made of the quantitative estimation of minute traces of this gas. The estimation of carbon monoxide when present in a combustible mixture to the extent of several per cent. is a matter of routine gas analysis, but when it is desired to obtain an accuracy of one or two parts per million the estimation becomes one of extreme difficulty. Gautier and Nicloux are credited as originators of the method of oxidizing the carbon monoxide by iodine pentoxide. It has been shown in these laboratories that this method is capable of a very high degree of accuracy, and, although a similar contention has been made by prior workers, it has not been found possible to obtain the desired degree of accuracy when the *modus operandi* specified by many of them has been followed closely. Certainly it would prove a vain hope for an experimenter to take iodine pentoxide from his laboratory shelf and employ it for the oxidation of carbon monoxide with the object of obtaining a degree of accuracy of even one part per 10,000. The necessary treatment for conditioning the specially-prepared iodine pentoxide has been determined, and an apparatus designed to enable a degree of accuracy of one or two parts per 100,000 to be obtained in the routine examination of new appliances. The method has been developed further to enable an accuracy of the order of one or two parts per million to be obtained in research work.



CHEMICAL LABORATORY.

Other Problems.

Then there is the determination of the type of energy emitted by a gas fire. Some would have it that too much short-wavelength energy is radiated. The investigations which have been carried out by the Central Laboratory of Messrs. Radiation during the past two years have shown that this statement has not a basis of fact. The possibilities of varying and controlling the wavelength of the energy which is emitted by a gas fire is now the subject of detailed study, which it is hoped will lead ultimately to practical results. The experimental difficulties of the work are great. The intensity of the energy of any particular wavelength is measured by the use of a delicate thermo-couple attached to a sensitive galvanometer. With highly sensitive galvanometers of the suspended magnet type, not only have the ordinary vibration troubles to be overcome, but in a city such as London other difficulties are encountered due to magnetic disturbances. The development of scientific research in recent years has led to the employment of increasingly sensitive pieces of apparatus, which for their successful use require laboratories as free as is possible from external influence. The new laboratories at No. 15, Grosvenor Place, appear highly satisfactory in this respect. They are well planned, and comprise a chemical laboratory, a gas analysis and calorimeter room, a general laboratory, and a physical laboratory. In addition there are a mechanical testing room, a machine shop, and a dark room. The illustrations show how excellently the planning and equipping have been conceived and executed. With the inevitable exception of the dark room, the premises are white tiled throughout, and are admirably lighted and ventilated.

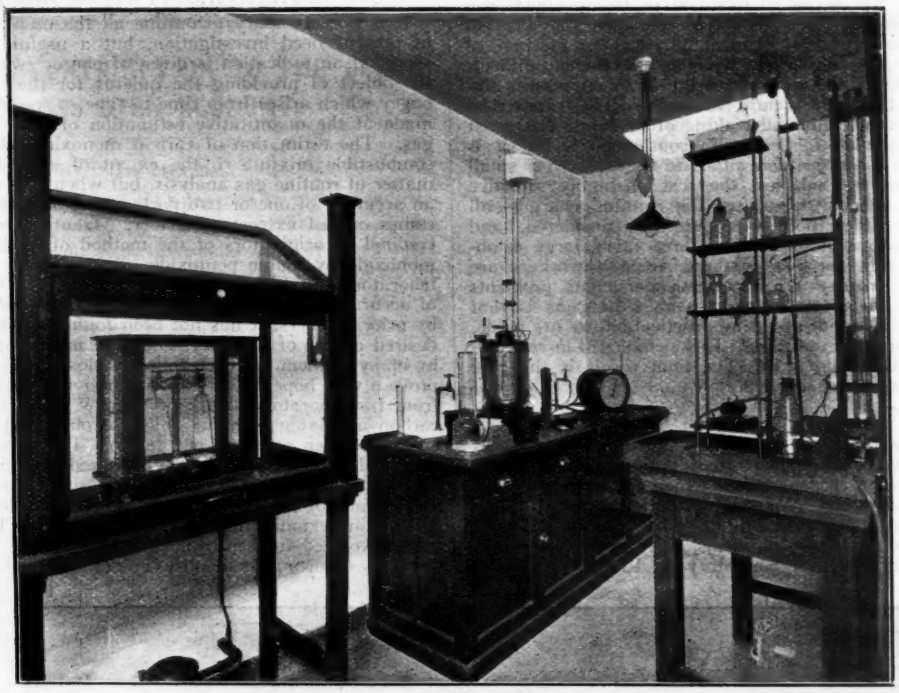
The Laboratories Described.

The neatness of the chemical laboratory is well indicated in the large photograph. At the far end, on the left, can be seen the routine carbon monoxide testing apparatus to which reference has been made. The calorimeter room, in which are installed a Bone & Wheeler gas analysis apparatus, a Boys calorimeter, and a balance, leaves nothing to be desired. The lighting is by an overhead window of small dimensions, so that the room is free from draughts and is not subjected to marked fluctuations in temperature. Ventilation experiments, and tests on the efficiencies of various appliances, are carried out in the general laboratory. Here there is an experimental chimney shaft fully protected from external influences, by which the ventilating effect of fires can be accurately determined. In this laboratory there is a highly interesting piece of apparatus for determining burner resistances. This is a pneumatic Wheatstone bridge, built in the form of a rectangular box ⊔. At the centre of the connecting limb, attachment is made to a suction pump. At the end of one limb is a thin plate pierced with a series of standard orifices. The burner to be tested is inserted in the other limb of the pneumatic bridge. Suction is then applied, and the standard orifices are adjusted (by covering one or more of them) until a needle contained in a small rectangular tube which connects the two limbs of the bridge prior to the main connecting limb is at zero position, showing that the two legs of the ⊔ are exactly balanced. The resistance of the burner is then determined by the number of standard orifices which *in toto* offer an equivalent resistance. The practical importance of this test will be readily recognized, for a knowledge of resistances will enable burners to be scientifically designed to conform to fresh requirements. Also in the general laboratory are gas fired furnaces suitable for work in connection with enamels and refractory materials as well as the necessary appliances for testing the standard articles of Radiation manufacture.

In the mechanical testing room there is an Avery tensile testing machine; and the machine shop is fitted with drilling machines for ordinary and specially fine work, a polishing, buffing, and grinding machine, a lathe, and air and gas compressors capable of delivering gas and air up to 3 lbs. per sq. in. pressure. Each appliance has its own electric motor. The physical laboratory is complete with all the necessary apparatus for determining the quantity and the quality of the radiation emitted from a gas fire; and in the dark room photo-micrographical and metallurgical work is performed. It is here that all recording galvanometers are kept.

A Praiseworthy Enterprise.

The photographs which we reproduce indicate the care which Messrs. Radiation have exercised in fitting up laboratories in every sense a model. The very atmosphere of the new central laboratory is one of efficiency, and this is bound to have its logical effect on the workers and the work produced



GAS ANALYSIS AND CALORIMETER ROOM.

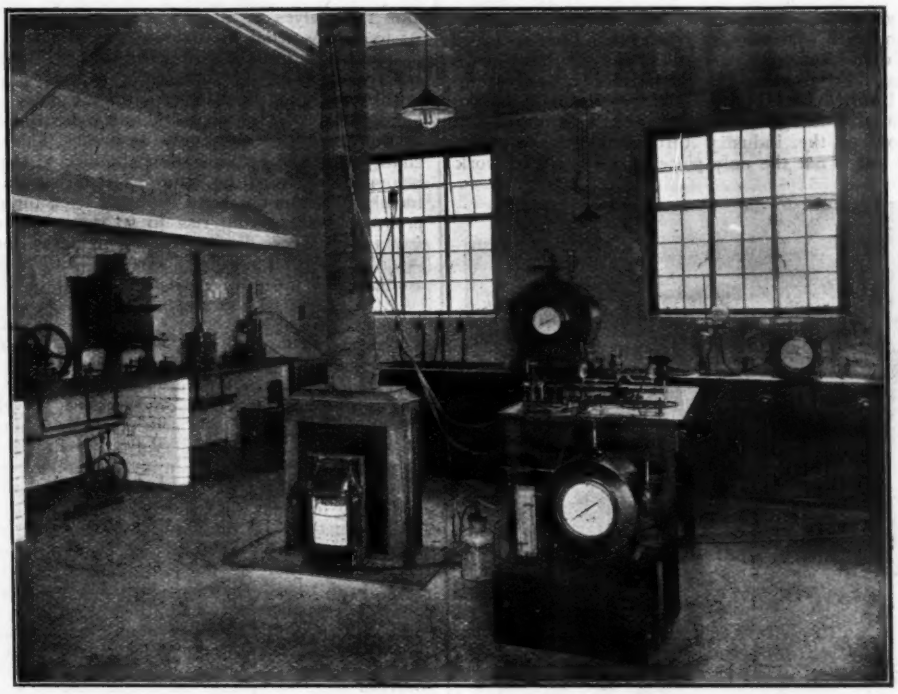
The gas industry owes a great deal of its success to the energy and enterprise of manufacturing firms associated with it; and the new venture of Messrs. Radiation should meet with the whole-hearted acknowledgment it so richly deserves.

THE SPEECHES.

The guests were received by Mr. H. James Yates (Chairman of Radiation Limited), who was supported by other Directors; and some short, but interesting, speeches followed.

For Pure Research.

Mr. H. James Yates: Ladies and gentlemen,—I wish, on behalf of myself and my co-Directors, to tender you a very hearty welcome this afternoon; and I think we are particularly fortunate in having with us the head of the gas industry, Mr. Milne Watson, who has very kindly consented to come and open our new Central Research Laboratories. I have always had an ideal before me in my business life, and that has been some day to have laboratories entirely for pure research. Such a thing, however, to be carried out by an individual concern, is a big undertaking; and it was only with the formation of Radiation Limited that it became possible. The laboratories here will be for pure research; and fortunately we have a most able staff for the purpose—Dr. Hartley, our Chief Chemist, being admirably seconded by Mr. Hamilton Davies and others. Now, in pure research we are investigating problems far removed from our ordinary every-day work. We are not dealing,

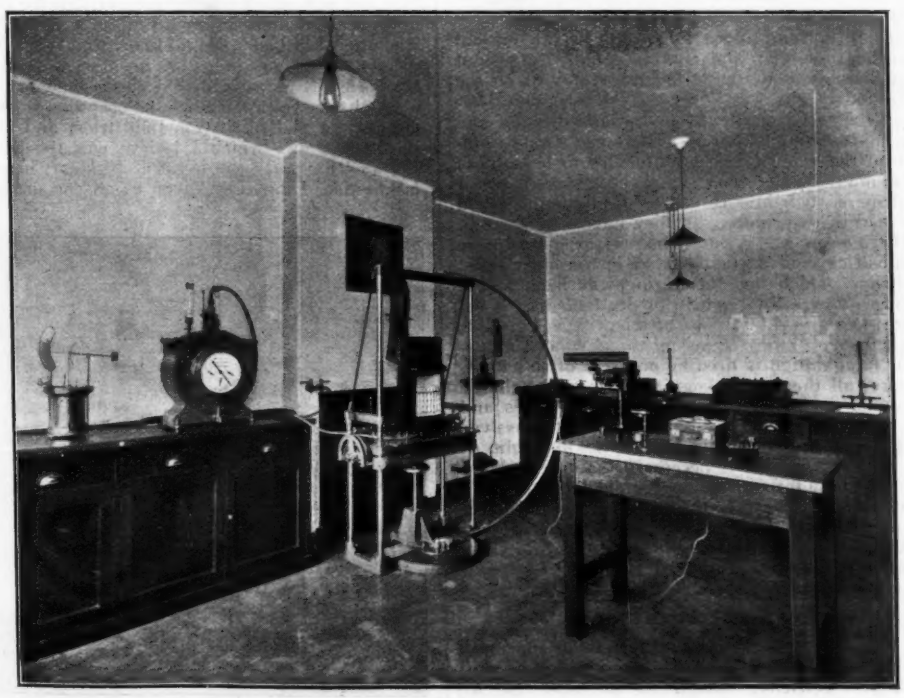


GENERAL LABORATORY.

in many cases, with the apparatus we are making to-day, but with fundamentals that we hope in future to make use of in the development of the gas industry. The carbon monoxide bogey arises at intervals, and in your visit to the laboratories you will see something of the steps which we have taken to ensure that so far as our own apparatus is concerned it shall always be nothing but a bogey. We have developed means of determining carbon monoxide when present only to the extent of one or two parts per million, and employ as a routine process in the examination of new appliances an apparatus capable of determining carbon monoxide to the extent of one or two parts per hundred thousand. The fact that we have reached this stage speaks for itself. When you go into the physical laboratories, you will see apparatus for investigating the wave lengths of energy emitted by different types of heating appliances. We are hoping to learn a very great deal from this research, and eventually to apply the knowledge so gained to gas fires. Sometimes we hear of criticism to the effect that gas fires are too incandescent, and emit too much short wavelength energy. That there is no basis of fact for this criticism we have proved for ourselves; and I think you will agree with me in saying that, when you see the charts. You will doubtless be much interested in the research apparatus used in connection with gas-fire burners. You will see the sensitiveness of it, and you will be astonished to find that even a gas-fire burner is the subject of such close investigation. I will not detain you any longer, but will ask Mr. Milne Watson to speak.

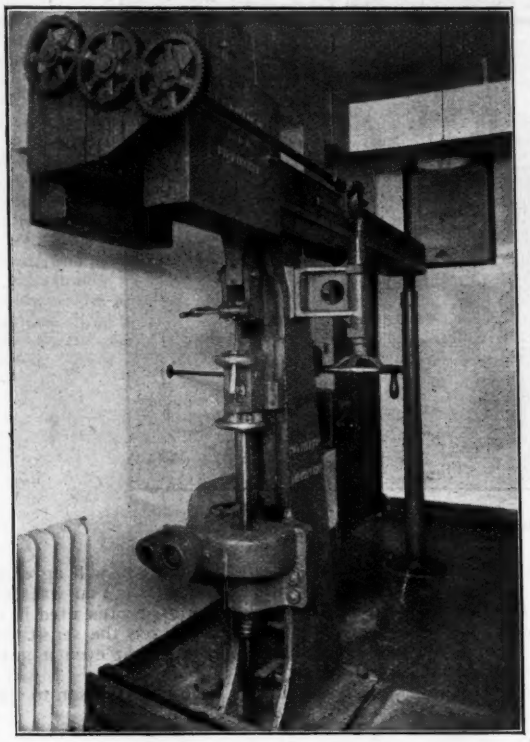
Importance of Scientific Research.

Mr. D. Milne Watson: Mr. Yates, Ladies, and Gentlemen,—I feel it a very great honour indeed that I have been asked by Mr. Yates and his co-Directors to come here to-day to open the Research Laboratory in this building. I was very glad to accept his invitation, as I approve so entirely of the steps taken by Radiation Limited. You have heard from Mr. Yates that this Central Laboratory is in no way to replace the laboratories at the works, which are fully occupied with ordinary routine work. It is a laboratory to be devoted specially to research work under the direction of Mr. Yates himself, with the able assistance of Dr. Hartley and Mr. Hamilton Davies. You



PHYSICAL LABORATORY.

will see, when you visit the laboratory in a few minutes, how complete it is, and with what care everything has been arranged so as to ensure obtaining accurate results. As you have heard from Mr. Yates, this laboratory, while primarily designed to help Radiation Limited to solve their own particular problems, will also be available for general work, and it is hoped will benefit the whole of the industry throughout the country. ["Hear, hear."] It is not the only piece of disinterested work



Mechanical Testing Room.

of this character that Radiation Limited have done, though Mr. Yates has been too modest to mention it. You will all like to know that Radiation Limited have lately endowed a Fellowship at the Imperial College of Science, South Kensington, for the purpose of carrying out research there. It is an excellent step, and under the guidance of our friend Prof. Bone, I have no doubt it will be a very considerable aid to science. [" Hear, hear."]

I particularly welcome this step which has been taken by Mr. Yates and his colleagues on the Board of Radiation Limited, as there is nothing more important at the present time than scientific research; and this is equally important whether it is on the side of the manufacture of gas or on the side of the utilization of gas. It is no use for the gas undertakings to perfect the carbonization of coal unless the gas supplied is burnt in up-to-date appliances. There are a vast number of problems on the side of gas manufacture to be solved; but there are also many on the other side to be attacked, and it is well that a firm of such importance as Radiation Limited should take the lead in this matter, as they have long done in other things. There never was a time when research was more needed in all industries, and particularly so in the older ones, like the gas industry, which had its origin away back in the early days of last century. New industries are hailed with enthusiasm, and are surrounded by troops of scientific enthusiasts who devote all their energy to bringing-up the new-born industry. The popular imagination is fired by progress of this kind, and it is, therefore, all the more essential that, while all the world's eyes, popular and scientific, are on the novelties and new industries, the old industries should keep themselves abreast of the times. To effect this, when the limelight of popular interest is withdrawn, it is necessary that the light of scientific research be brought to bear on the old industry. To take another illustration: The fact that motor cars and aeroplanes have been invented does not lessen the need, but makes it more important, for the railway engineers to devote their attention to research, so as to enable the older form of locomotion to compete with the new forms.

Sphere of Gas Assured.

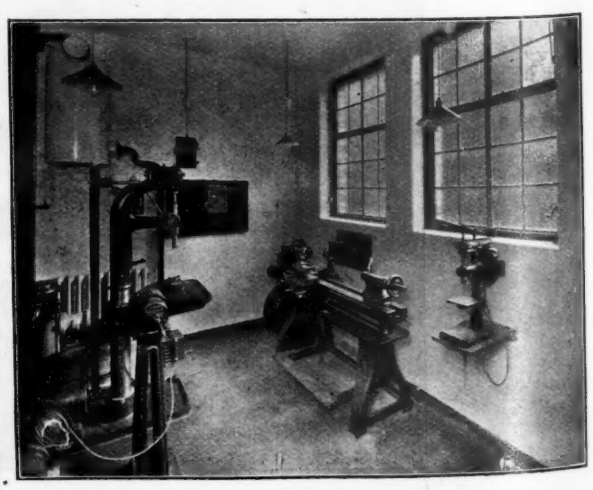
Mark you, in this case it is not a question of the supersession of one industry by another; there is no question of gas being superseded by electricity, though we are often led to suppose that this is so when reading articles by enthusiastic electricians or by politicians looking for some cry to rehabilitate themselves or their party's fortunes. These would lead us to suppose that the days of gas are over, that the industry is awaiting burial, and that the future belongs entirely to electricity. Nothing is further, of course, from the truth, notwithstanding all that electricity has done and can do. The sphere of gas in the domestic and industrial life of the country is there, and is absolutely assured. The uses of gas may change, but the carbonization of coal and the utilization of gas belong as much to the future as electricity, as no one with any foresight can doubt. An industry used in so many industrial processes, and giving rise to so many other industries—dye-stuffs, fertilizers, drugs, supplying motor fuel, benzole, &c.—is one which cannot be dispensed with, even to gratify the ambitions of pushing electricians. As I have said before, however, it is all the more necessary that an industry which has passed, so to speak, out of the stage of being a novelty, and has therefore lost its hold to a certain extent on the popular and scientific interest outside its own circle, should devote its own energies to seeing that it does not lag or fall behind. I am glad to say that the gas industry is very much alive in this direction. Both at Leeds University and in the research laboratories of the various gas undertakings, and now in the laboratory of Radiation Limited, questions are being tackled which are vital to the prosperity of the industry; and it is gratifying to know that this, which is one of the oldest industries, is in the forefront, and is to-day most carefully studying the problems which it has to face. I am, therefore, particularly glad to come here to-day and open this latest addition to the laboratories of the country which are studying these problems. I wish every success to Radiation Limited in their enterprise—especially if what they have done will not only advance themselves but the whole industry. I feel that we as an industry shall owe them a great debt of gratitude for helping us. [" Hear, hear."] I have great pleasure in declaring the firm's new Central Research Laboratories open.

For the Good of the Industry.

Mr. Yates: There falls upon me the pleasant duty of proposing a hearty vote of thanks to Mr. Milne Watson for coming to open these laboratories, and for saying what he has with regard to the work we have done, are doing, and hope to do. My co-Directors and I want you to feel that these laboratories are open for the development of everything that is good in the gas industry, and that it is our intention to assist development in every way we can. These laboratories are, of course, only intended to deal with a certain section of work; but within the limits of that section we are always wishful to help the industry. Therefore we hope you will not hesitate to consult us on any doubtful points. I wish to say personally how very greatly I appreciate Mr. Milne Watson's coming here, because his side of the industry is different from ours. He is the head of the industry; and it is an honour to us that he should have consented to open our new laboratories.

Mr. Milne Watson's Encouragement.

Mr. H. M. Thornton: In seconding this vote of thanks, I should like to say that we are greatly indebted to Mr. Milne Watson, not only for being present, but for the encouraging remarks he has made in regard to the work that has been done by Radiation Limited. We all know that when Mr. Milne Watson speaks to the gas industry, he always says the right thing—always gives us a word of encouragement and helps us on our way. I can well remember the occasion on which he addressed the Society of British Gas Industries, and made that remarkable deliverance which I believe was the beginning of a very fine movement for the industry [" Hear, hear "]; and here to-day he has, I am sure, given us all encouragement. We shall

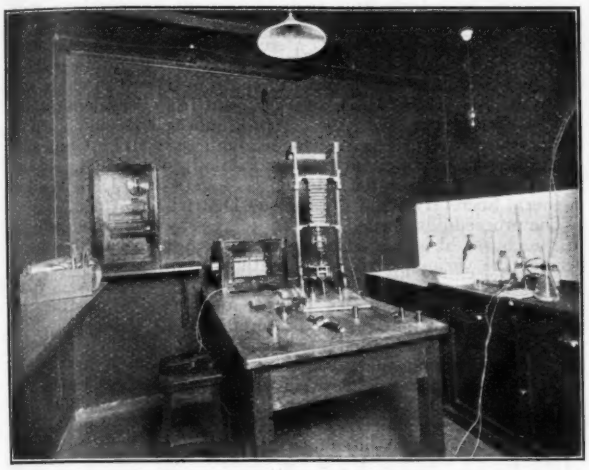


Machine Shop.

always feel grateful to him for having thus manifested his interest in us on this important occasion.

On Behalf of the Commercial Section.

Mr. J. H. Ellis: May I, as President of the British Commercial Gas Association, on behalf of the commercial section of the industry, associate myself with what has been so well said by Mr. Yates and Mr. Thornton in thanking Mr. Milne Watson? We cannot, however, thank the President of the National Gas Council for coming here without thanking those who brought him. Radiation Limited have done a great work for



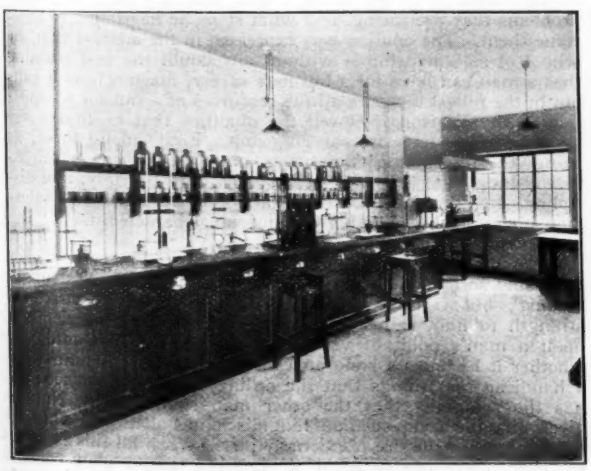
Dark Room.

us; they have, I hope and believe, done a great work for themselves. Reward sweetens labour; I trust their labours may be still sweeter in the time to come than they are to-day.

Congratulations from Prof. Bone.

Prof. W. A. Bone: I am sure you would not wish to leave this room to take part in the remaining proceedings of the afternoon without wishing the firm of Radiation Limited every success in their new enterprise. We congratulate them very cordially on the conception and building of these new laboratories, and we just as cordially wish them success in the work that in future will be carried on in them.

As Mr. Yates has said, these new Central Research Laboratories represent the attainment of an ideal, the first steps towards which he took, I think, when he engaged one of my old

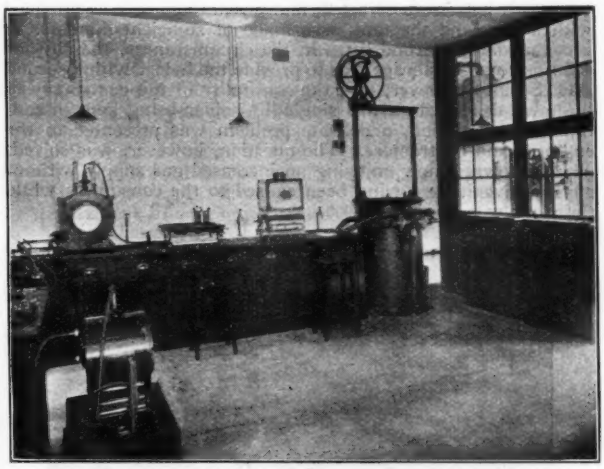


Another View of the Chemical Laboratory.

students from Leeds University. It is particularly gratifying to me to find that he is still firm in his belief in the final rewards which will come as the result of the patient application of scientific research to the problems of his industry.

Reference has been made by Mr. Milne Watson to the fact that this important group of firms have recently shown their appreciation of the value of training men for this kind of work, by establishing, in connection with my own department at the Imperial College of Science, a Research Fellowship. Mr. Milne Watson did not mention that through his kindness we were also indebted to the Gas Light and Coke Company for another Fellowship in my Department. The men holding these Fellowships will be trained in the same way as the present staff of the laboratories here were trained in days gone by at Leeds. All this is a matter of profound gratification to us, and is proof of the foresight of those to whom we have listened this afternoon. I have, on behalf of the Rector of the Imperial College, to express to Mr. Yates and to Mr. Milne Watson his great regret that, owing to an examinations meeting, he is unable to be present; but he sent me a letter, from which the following is an extract:

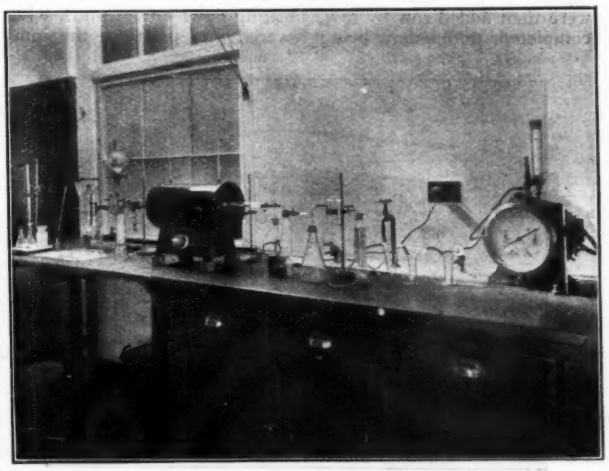
> "This new enterprise on the part of Radiation Limited is consistent with the liberal policy that they have adopted hitherto in their support of both fundamental and applied research; and my colleagues join me in wishing success to an activity which will ensure the development of an industry of fundamental public importance. If in any way we can assist in the solution of special and accessory problems, your Association can always count on the ready co-operation of the College staff."



Another View of the General Laboratory.

The vote of thanks to Mr. Milne Watson was carried by acclamation, and thereafter the visitors separated into two parties for the purpose of inspecting the laboratories and enjoying two excellent propaganda cinema films which the firm have had prepared. Tea brought a delightful function to a close.

Owing to space limitations, the invitations to the opening of the laboratories had to be limited to members of the Central Executive Board of the National Gas Council, the Council of the Institution of Gas Engineers, and the British Commercial



Carbon Monoxide Testing Apparatus.

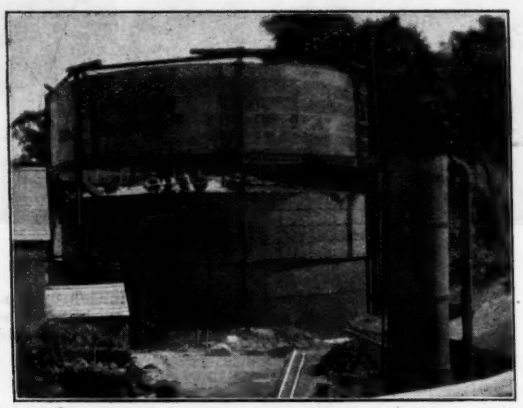
Gas Association, with a few scientific friends who are associated with the industry. But we know that Radiation Limited will be pleased for gas-engineering friends who are interested to inspect the laboratories. We have not consulted them as to this; but we suggest, in view of the delicate character of some of the work that will be proceeding there, that anyone proposing a visit should ascertain whether the time is convenient.

"The Confessions of a Capitalist."—From Messrs. Hutchinson & Co. we have received a copy of "The Confessions of a Capitalist," by Sir E. J. P. Benn, Bart., in which the author explains the workings of the capitalistic system as illustrated by his own business. The book is published at 18s. net.

ENLARGING A SMALL GASHOLDER.

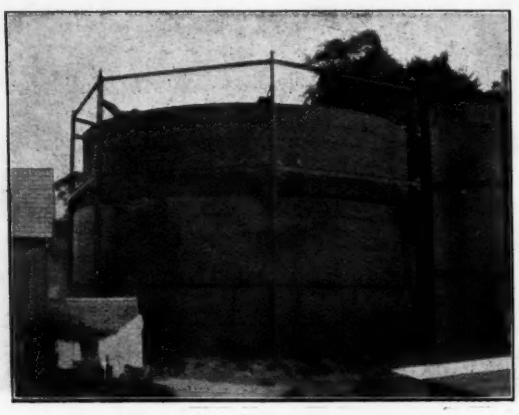
An interesting piece of engineering work has just been completed by Messrs. Edward Cockey & Sons, Ltd., for the Hurstpierpoint Gas Company, at their works at Hurstpierpoint, Sussex, under the instructions and supervision of the Company's Consulting Engineer, Mr. Alec E. Whitcher, of Haywards Heath.

For some time the Company had found their storage inadequate. This consisted of a single-lift holder, 48 ft. dia. by 12 ft. 10 in. deep, column guided, in a steel tank. Fortunately, when this holder was erected, many years ago, it was provided with a cup, and the tank was made of sufficient diameter to accommodate a second lift. In the circumstances, the obvious solution to short storage was to provide the holder with a second lift. Seeing, however, that the continuity of the gas supply to the town depended on this single-lift holder being kept in continuous commission, a delicate problem was presented to the engineer and contractors. The question, however, was solved, and the town is now enjoying an increased gas supply without any inconvenience having been caused to the consumers while the work was in progress.



New Outer Lift Completed, but Suspended.

The method of carrying-out the work was probably unique. The first operation was to extend the guide-framing. This consisted of 7 R.S.J. verticals, 10 in. by 5 in., connected together at the top by horizontal girders. As soon as these were in position, the sections of grip channel for the new lift were slung to the horizontal members, and securely riveted together. The skirting plates of the grip and the side sheets were then added row by row, working downwards, until, when completed, and before being lowered into position, the inner



New Lift Lowered into Position and Job Finished.

lift of the holder worked in the lower half of the guide-framing, and the outer lift up in the air, suspended from the top girders. This can be seen in the accompanying illustrations. The task of changing the bottom rollers of the inner lift, and the removal of the guide carriages and rollers from the crown of the inner lift, so as to permit the lowering of the new lift into position, was accomplished without hitch, and the work has been completed to the entire satisfaction of the Directors and the Consulting Engineer of the Company.

Manchester and District Junior Gas Association.—The report of last Saturday's meeting of the Association at Bolton is in type, but is unavoidably held over. It will be published in next week's issue.

GAS SALESMEN'S DAY AT WEMBLEY.

[For the Full Report of the Proceedings, see the number of the "Gas Salesman and Gas Service" which will be published on Oct. 14.]

Those who attended Salesmen's Day at the British Empire Exhibition last year looked forward with keen anticipation to the repetition of the function, which had been announced for Wednesday last. However high expectations had been placed, they must have been fully realized; for all the speakers were enthusiastic and very much to the point. Attendance and the weather were also good. Conference Hall No. 1 at Wembley was well filled; those present being estimated to number about 600, and coming from all parts of the country. The chair was taken by Mr. J. H. Ellis, of Plymouth (the President of the British Commercial Gas Association), and he was supported on the platform by Mr. F. W. Goodenough (Executive Chairman of the British Commercial Gas Association), Mr. W. M. Mason, Mrs. Cloudesley Brereton, Mr. R. J. Rogers, Mr. J. C. Walker (General Secretary), and the various District Chairmen.

The proceedings opened with an address by Mr. Goodenough, in the course of which he made an earnest appeal to the members of the various Circles—as distinct from the Executives—to give of their very best to make the Circles a success. With regard to the programmes for the next twelve months, he stated that the Chairmen and Secretaries, at a meeting held some time ago, had discussed this matter, and they came to the conclusion that there were one or two points that might well be taken into consideration by all the Circles during the coming winter, for the benefit of the industry as a whole and of the members themselves. The first of these subjects was the inspection and maintenance of consumers' appliances and fittings—as a business-getting proposition, as well as a business-keeping proposition—and the second was coke sales as a necessary adjunct to gas sales.

There followed brief statements by nine District Chairmen as to the past and future work of the different Circles; and all that they had to say was of an encouraging nature. Attendances at the meetings are good; and in every way interest in the proceedings is being fully maintained. In short, the statements made it abundantly clear that good work is being accomplished all round. Then came the main item of the programme, in the form of a highly practical address.

As the subject of this address, Mr. Angus Watson, J.P. (Chairman of Messrs. Angus Watson & Co., Ltd.), took "The Ethics of Salesmanship;" and what he had to say was followed closely by the audience—for he drew largely from his own experience, and confirmed his various points by personal illustrations. It was the best type of address for such an occasion; because there is every justification for Mr. Watson's belief that an older man can help his younger colleagues by telling them how he himself has had to face the same problems they are facing, and what steps he has taken to overcome them. The opinion was expressed in the address that the school of salesmanship is without any doubt the best training that a man can have for a business career, inasmuch as it calls out in the fullest measure all the resources of a capable business man. Mr. Watson reviewed the qualities that he thinks are necessary for successful salesmanship. First among these, as being the most important, was placed character—straightforwardness, courage, persistence allied with courtesy, and discipline. Imagination is an essential quality for successful salesmanship; while another highly important characteristic is "the joy of work for its own sake."

As to the handicaps that will make for failure, every man has some sort of handicap in his life which he must struggle against; but rightly understood, this may be a source of strength to him, rather than weakness. Everything depends upon a man's point of view when he realizes his handicap, whether it becomes a bane or a blessing to him. A man with a handicap sees things that the ordinary man cannot see; he has the sympathy that the other man cannot feel. Nature gives him the compensation that discipline alone can obtain; for the laws of life are fractionally just. When all this is said, however, there are personal weaknesses that a man cannot allow to come into his life, if he wishes to make a success of his task; and Mr. Watson cited, as perhaps the most frequent causes of shipwreck in business, drink and betting. Other constant forms of failure in business are fear and worry. "The tragedy of life is that so many of us do not discover until it is too late that we are allowed to shape our own destiny, and that a man eventually becomes what he thinks. 'Sow a thought—you reap an action. Sow an action—you reap a habit. Sow a habit—you reap a destiny,' says the old philosopher, and it is true that as life progresses we are all forging fetters for ourselves from which there is eventually no escape." Finally, there is the temptation to adopt methods in business which are dishonest.

Mr. Watson was heartily thanked for his address, and a large number of those present proceeded to luncheon in the Grand Restaurant. Subsequently there was a visit to the Gas Exhibit; and tea brought the programme to a close.

FORTHCOMING ENGAGEMENTS.

Oct. 10.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Meeting at Edinburgh. Address by Mr. W. B. M'Lusky, of Halifax.

Oct. 10.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Visit to the Ystrad Gas-Works, followed by a meeting, under the presidency of Mr. B. J. Bell, for the induction of the President-Elect, Mr. J. Wood.

Oct. 14.—INSTITUTION OF ENGINEERS-IN-CHARGE.—Meeting at St. Bride Institute, at 7.30 p.m.

Oct. 14.—INSTITUTION OF CHEMICAL ENGINEERS.—Reception at the Science Museum, South Kensington, at 8.30 p.m.

Oct. 15.—MURDOCH LODGE.—Meeting.

Oct. 16.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.—Autumn meeting at Stockton-on-Tees.

Oct. 19-21.—BRITISH COMMERCIAL GAS ASSOCIATION.—Annual conference and general meeting in Plymouth.

Oct. 28.—EVENING STAR LODGE.—Meeting.

Oct. 30.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute.

Nov. 7.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Joint meeting with Western District, at Glasgow.

Nov. 12.—SOCIETY OF BRITISH GAS INDUSTRIES.—Autumn general meeting at the Hotel Cecil, under the presidency of the Rt. Hon. Sir Alfred Mond, Bart., M.P.

Nov. 18.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Meeting at the Hotel Cecil, Strand, W.C. 2, at 2.15 p.m.

Nov. 25.—EVENING STAR LODGE.—Meeting.

Dec. 5.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Visit to the Alloa Gas-Works. Paper by Mr. W. Scott.

INSTITUTION OF GAS ENGINEERS.

Oct. 12.—2.30 p.m., Refractories Research Joint Committee.

Oct. 12.—4.15 p.m., Calorimeters Committee.

Oct. 13.—4.0 p.m., Consultative Committee of the Education Scheme, followed by meeting of the Advisory Committee.

Oct. 14.—10.30 a.m., Emergency Committee. 11.30 a.m., Council. 2 p.m., Finance Committee. 3 p.m., Wrought-Iron Tubing Inquiry Committee.

Oct. 14.—6 p.m., Joint Meeting, at the Institution of Civil Engineers, Great George Street, Westminster, with bodies co-operating in the work of the Special Committee on tabulating the results of heat engine trials.

Nov. 10.—4 p.m., Advisory Committee on Education.

Nov. 11.—11.30 a.m., Emergency Committee. 12.15 p.m., Benevolent Fund Committee of Management. 12.45 p.m., Finance Committee.

Nov. 25.—11 a.m., Institution's session at the Public Works, Roads, and Transport Congress.

Dec. 2.—Official visit to the Shipping Engineering and Machinery Exhibition at Olympia.

Dec. 8.—4 p.m., Advisory Committee on Education.

Dec. 9.—11.30 a.m., Emergency Committee. 12.30 p.m., Finance Committee.

ENRICHMENT OF COAL GAS BY INJECTING OIL INTO VERTICAL RETORTS.*

A Fuel Research Board Technical Paper.

When Mr. Samuel Tagg, of Preston, was President of the Institution of Gas Engineers, he suggested that the Fuel Research Board should carry out experiments on the injection of gas oil into retorts during carbonization. With ordinary steaming in vertical retorts it had been shown by the Fuel Research Board and the Gas Investigation Committee of the Institution of Gas Engineers that, though the thermal yield of gas is increased, its calorific value falls as the amount of injected steam rises. This fall in the calorific value of the gas limits to some extent the application of steaming. The usual method adopted to raise the calorific value has been the addition of carburetted water gas made in a separate plant and brought into use as required. Mr. Tagg thought that the necessary enrichment might be obtained by injecting gas oil into the retorts during carbonization, thus increasing the elasticity of the retorts, and avoiding the use of a separate enriching plant. Fuel Research Board Technical Paper No. 14, which has just been published by H.M. Stationery Office, is a report of the investigation undertaken as a result of this suggestion. The retorts used for the test consist of a setting of four vertical retorts of the Glover-West type, with a normal throughput of 2·5 tons a day for each retort. This setting is at the Greenwich Station of the Fuel Research Board, and has been employed previously for experiments on carbonization and the effects of steaming—reports of which investigations have been reviewed in the "JOURNAL."

EFFECT OF INSERTING OIL INJECTION TUBES.

It was arranged that the oil should be introduced by inserting a tube down the retort as near the centre as possible and at such a depth that the oil issuing from it would be immediately subjected to a sufficiently high temperature. As it was considered necessary that the oil should reach the cracking zone without being overheated, the tube was made with a water jacket. When the water-cooled tubes were placed in position, and before oil was injected, it was found necessary to increase the fuel gas supply to the combustion chambers. When oil was injected, no further increase of fuel was required to maintain steady temperatures, thus showing that the thermal changes in the cracking process were too small to be detected by the methods of measurement available. The heat removed from the coal by the cooling water jacketting the injection tube averaged 0·47 therm per hour. This drain of heat is, of course, considerable; and Appendix II. of the report is a note on the use of a plain instead of a water-cooled tube. It was found that a plain 2-in. tube would stand the temperature conditions inside the retort, but that when this tube was only a short distance from the centre of the retort (3¼ in.), it was still sufficiently near the wall to prevent the coal following its usual course. It was also discovered that, when a 7-ft. plain tube was used in this position, a hole of considerable depth persisted in the coke beyond the end of the tube; and this had a distinct effect on carbonizing conditions. The matter is still under investigation by the Board.

MAIN RESULTS OF EXPERIMENTS.

Mitchell Main nuts was the coal selected for the work; and before starting on this coal, three preliminary experiments were carried out on Wearmouth coal. In the first stage of the investigation a determination was made of the depth to which the tubes should be immersed in order to give the maximum amount of enrichment. This was found to be from 10 ft. 6 in. to 12 ft. 6 in. from the top of the retorts. The main results of the Mitchell Main experiments are summarized in the following table. A carbonizing temperature of 1200° C. was maintained, and the amount of steam injected was 5 p.ct. by weight of the coal.

TABLE I.

—	Zero. Test No. 4.	Tubes in Position. Test No. 5.	Oil Injection. Test No. 6.	Oil Injection. Test No. 7.
Conditions—				
Steam		Constant at 5 p.ct.		
Oil injection	*Nil*	*Nil*	4·8	9·4
Gas yield per ton of coal—				
C.ft.	15,600	15,150	15,450	13,730
Therms	80·81	80·14	86·21	88·40
Increase from zero test	..	0·67	5·40	7·59
Gas calorific value—				
B.Th.U. per c.ft. (gross)	518	529	558	562
Increase from zero test	..	11	40	44
Gas specific gravity (air = 1)	0·423	0·421	0·424	0·429
Additional fuel gas required per hour—				
Therms	..	0·6	0·7	0·3

The conclusions which may be drawn from Table I. and from observations during the course of the experiments are as follows:

1. The introduction of the water-cooled tube causes a reduction of gas yield, but an increase in the calorific value of the gas. Heating of the water causes a drain of heat on the setting equivalent to 0·47 therm of water gas per hour, for the setting of four retorts.
2. The injection of oil produces an increase in both gas calorific value and gaseous therms. No additional heat is required for the setting. Further increases in the amount of oil injected give increased yields of gaseous therms, but the raising of the calorific value is not in proportion.
3. The working of the retorts is almost as steady as before, but the position of the injection tube must be altered at intervals to allow the coke to remove carbon deposits from the wall of the retort opposite the end of the tube.
4. The upper practical limit of oil injection seems to lie between 10 and 15 gallons per ton of coal. Above this

* Fuel Research Board Technical Paper No. 14. "The Enrichment of Coal Gas by the Injection of Oil into the Retorts during Carbonization." Published by H.M. Stationery Office, Adastral House, Kingsway, W.C. 2. Price, 1s. 9d. net.

value the gas contains an excess of condensable hydrocarbons, and some oil passes over into the tar.

5. The yields and qualities of the coke, tar, liquor, and ammonium sulphate are not appreciably affected by oil injection.
6. The effect of oil injection on the specific gravity of the gas is slight.

"Commercial" Tests.

Special carbonizing experiments of short duration were carried out on what are referred to as commercial lines. In these an arbitrary upper limit was placed upon the heat available for the combustion chambers, and the elasticity of the retorts as a gas-making unit was determined. The gas yield at 5 p.ct. of steam was taken as the lowest required, and the calorific value obtained (520 B.Th.U.) was regarded as that "declared." It was found that increases of volume of gas of uniform calorific value and specific gravity were obtained up to a maximum amounting to 16·5 p.ct. of the yield at 5 p.ct. of steam. This necessitated steaming to the extent of 20 p.ct., oil injection at the rate of 7·13 gallons per ton of coal, and the use of approximately the full consumption of fuel allowed.

Table II.—"*Commercial*" *Tests.*

Gas Yield.	Minimum.		Maximum.	
	(1)	(2)	(3)	(4)
Steam . . . . . p.ct.	5·05	8·51	11·95	20·14
Oil . . . . gallons per ton	*Nil*	Tubes in, no oil	4·82	7·13
Fuel gas . therms per hour	15·2	15·8	16·4	16·9
Coal gas—				
C.ft. per ton	15,600	16,270	17,370	18,180
Increase over minimum .	..	670	1,770	2,580
Therms.	80·81	84·93	91·19	94·54
Increase over minimum .	..	4·12	10·38	13·73
Calorific value, B.Th.U. .	518	522	525	520
Specific gravity (air = 1) .	0·423	0·423	0·423	0·427

ELECTRIC STREET LIGHTING IN RURAL AREAS.

By Edward C. Lennox, of Newcastle-upon-Tyne.

[Abstracts from a Paper before the Institution of Public Lighting Engineers.]

Modern street lighting practice, like all other branches of illumination, is steadily developing on a more scientific basis, and the use of light sources of higher intensities is becoming more common.

This has been brought about by the increased use of fast road transport, necessitating improved lighting as a safety factor to the general public. The change brought about in our towns and cities during the past few years is little short of revolutionary to the standard generally accepted (say) prior to the war. The ultimate aim, however, of lighting engineers and superintendents is to make the streets of our towns as safe by night as by day; and as this desideratum can hardly be said to have been attained except in certain of the principal thoroughfares, there is undoubtedly much work still to be carried out.

The increasing amount of road transport that has made streets and roadways in towns so dangerous during dark hours has made the roadways and highways of villages and rural areas equally dangerous; and the necessity for providing these outlying places with a means of road illumination after dark becomes increasingly more urgent to ensure the safety of such of our rural population as would use their roadways after sunset.

The advantages gained by such illumination are:

1. Dangerous corners and curves would be made safer by showing-up obstructions, the width of the road and crossroads, and the presence of ditches.
2. Directing and danger signs would be lighted.
3. The effects of glare from motor-car headlights would be reduced.

Not only would pedestrians benefit from the provision of illumination, but night motor traffic would be safeguarded; and with the present increasing use of motor delivery facilities to rural areas, this traffic is reaching large proportions.

4. Night traffic could be considerably increased, thereby relieving, to some extent, day traffic congestion.
5. The increased speed of vehicles made possible by the increased safety factor of well-lighted roads will give a decrease in running time and costs, and an increase in road capacity. Night driving is also made more comfortable to the driver by (*a*) relieving eye strain, and (*b*) assisting repairs.

The lighting of rural areas with long straggling roads presents, however, a rather different proposition from that of lighting our city streets. The high standard of illumination aimed at in the busy thoroughfares of towns is not essential. Nevertheless, the lighting must be such as to fill the foregoing conditions. Economic conditions are different. The town, with its high rateable value and comparatively shorter lengths of roadway to be lighted, and the rural area, with its very low rateable value and long lengths of roadway to be lighted, present two entirely different problems.

Present-day legislation in this country places the burden of lighting on the ratepayers of the parish concerned. The only Act in force applying to lighting is the Lighting and Watching Act, 1833, which must first be adopted by the majority of the Government electors in the parish. The costs of supplying and maintaining a street lighting scheme having been ascertained, and approved by a majority of the electors, rates are made for lighting purposes as to 25 p.ct. of rateable value for agricultural land, and 100 p.ct. of rateable value for properties.

This method of assessing taxation for parish lighting is grossly unfair where the majority of the roads to be lighted are main roads, and must be efficiently lighted to ensure the safety of the pedestrian, local or otherwise, against motor or other transport, irrespective of whether or not they contribute in any way to the needs of the parish. Further, it is unfair in cases where a parish has a high rateable value due to the presence of large works, &c., but has a much smaller amount of road to be lighted than a neighbouring parish without works, &c., and therefore of low rateable value.

Lighting the streets and highways is now the only public necessity left in the hands of the local parish council, and provided by "local" rates; roadways, sewerage, and watching being provided out of the combined rates of the whole rural or county area. Recognition of this fact has already been made in America; and there has recently been passed by at least one large State a Bill which allows the counties of the State to appropriate money for the illumination of highways. A board of supervisors has been set up; and they will submit proposals for lighting public highways or portions thereof, or bridges located outside the town or cities. The expenses for installing and maintaining the lighting system are provided and appropriated in the same manner as the county expenses.

It may be suggested that it is not necessary to light the whole of the roadways within the parish boundary, and to limit the scheme to the village only. This is often carried out on the grounds of economy, but is objected to by the farmers who live some distance from the village, and who are generally the biggest ratepayers. Their point is that, if they must be forced to pay street lighting rates, they should have some benefit.

It is usually necessary for a parish, after deciding to adopt the Lighting and Watching Act, and having ascertained the full cost of the lighting scheme, to obtain a loan to cover the capital costs. The annual cost of repayment of such a loan being as a rule a decreasing figure, the lighting authority has a certain amount in hand to carry-out extensions or improvements. The initial scheme put forward should therefore be the minimum that can be offered consistent with the general objects of lighting, and every facility should be made for adding to the scheme or providing larger units throughout.

In the thickly populated Northern Counties the demand for street lighting is very high; and every effort is being made to meet this demand by extending the electric supply network. The rapid development, the efficiency, and the increased economy of the electric lamp, together with the many inherent advantages that the use of electricity offers, have helped materially to reduce the initial capital outlay on necessary equipment. Especially in the designing of new schemes has this been the case. Parishes not supplied with means of illuminant other than oil, candles, &c., have been enabled to make use of the Lighting and Watching Act, 1833, by the amalgamation of schemes for the provision of supply of electrical energy for lighting, heating, and cooking purposes in their business premises and houses, and for lighting purposes in their streets and roadways.

The Electric Lamp.

One of the first uses of electricity in its early stages was for street lighting purposes. The lamps then used, the carbon filament type, would not be tolerated by the street lighting engineer of to-day; but the most modern electric lamp, the

gasfilled type, has provided him with a lighting source of extreme convenience and adaptability. The tungsten vacuum, or metal filament, lamp has now practically reached its maximum efficiency, as the glowing filament of the lamp would necessarily have to run at a higher temperature in order to increase the amount of light emitted. This additional heat would make the metal evaporate more quickly, causing the lamp to blacken and burn out earlier. The use of an inert gas such as argon surrounding a suitably-sized filament enables the latter to be heated to a much higher temperature, and, therefore, brilliancy, without any appreciable evaporation. Thus, in the gasfilled lamp, though an additional amount of energy in the form of heat is wasted by conduction or convection through the gas from the wire to the glass bulb, the amount of light emitted for a given consumption is much higher than that given by a vacuum lamp having the same consumption and life.

The waste of electricity by gas causes a constant stream of hot gas to flow from the filament to the top of the bulb; and in order that certain vital parts of the lamp may be as far as possible from the source of heat and the incidence of the gas stream, a special club-shaped bulb is used. It is because of this hot gas stream that it is advisable to use the standard gasfilled lamp in a vertical position; but as the requirements of street lighting do not as a rule demand any other position than the vertical, this is no disadvantage. In order to reduce the loss of energy by heat, due to the large radiating surface presented by the long filament necessary for the high voltage of supply mains, the filament has been coiled or spiralized so that as small a surface as possible is presented to the gas circulating in the bulb. The spiral filament acts almost as a short thick wire in respect of the emission of light and loss of heat. The advantage gained in this lamp by the additional amount of light emitted for each unit consumed more than counteracts the loss of energy by extra heat generated.

Made in standard sizes for many voltages and from 30 watts (275 lumens) to 1500 watts (24,830 lumens), a lamp may be chosen to give the exact amount of illumination required. Its low current consumption for the illumination provided makes its use economically desirable. Moreover, when used with suitable reflectors, the capital and maintenance costs of the complete unit are comparatively low.

When comparing illumination value in candle-power of lamps of the vacuum type with similar-sized lamps of the gasfilled type, it should be borne in mind that, where stated in "candle-power in the maximum direction," the figures given refer to mean horizontal candle-power in the case of the former, whereas the measurement in the downward direction is given for the gasfilled lamp. The method of expressing the efficiency of lamps in spherical candle-power has obviated the possibility of error in comparing efficiencies; but the only satisfactory method of comparison is by giving efficiency in terms of lumens per watt. This figure is obtained by dividing the total lumens obtained from the lamp by the watts input.

One of the essential points to be considered in laying-out an electrical street lighting installation is the question of voltage variation. The voltage from the supply station is, of course, liable to some slight variation due to the varying loads; but these variations are usually kept strictly within prescribed limits. It often happens, however, that, with the idea of obtaining more value for money (by extending the working life of the lamp), lamps are fitted to a circuit with a pressure of (say) 10 p.ct. below that for which they were made. As an example of what really occurs, let us assume that a 200-volt lamp is made to operate on a circuit at a pressure of 180 volts—a reduction of 10 p.ct. in voltage. The reduction in efficiency of the lumens emitted would be 33 p.ct. In other words, instead of getting 100 units of light, only 67 units would be obtained. Conversely, if a 200-volt lamp were operated on a 220-volt circuit, an increase of luminosity to the extent of 40 p.ct. would be obtained.

The light emitted by a lamp depends, of course, on the temperature of the filament. Thus it is interesting to note that 1 p.ct. change of temperature produces a change of light output of 11 p.ct.

When one is buying light, as is undoubtedly the case with street lighting authorities, it should be considered which is the more economical problem:

(1) Running the lamp at a lower pressure than that for which it was designed, and so getting a longer life but a less efficiency, or

(2) Running the lamp on higher pressure, and so getting better efficiency, but shortening its life.

From a volts-lumens and a volts-watts curve may be derived the following:

Example.—Take a 200-volt 100-watt lamp costing 5s., supplied with current at 3d. per unit. Normal life 1000 hours. Average lumens 1100.

Cost of energy for lamp giving 1100 lumens for 1000 hours	£1 5 0
Cost of lamp	0 5 0
Total cost including lamp	£1 10 0

Now consider:

1.	
Lamp operated at 10 p.ct. below rated voltage, and life extended to	1500 hours.
Light output would be reduced by	33 p.ct.
Lumens output is therefore only	737 lumens
10 p.ct. under-running of lamps lowers watts consumed by	15·5 p.ct.
Therefore, watts consumed by lamp =	84·5 watts.
Cost of energy for lamp giving 737 lumens for 1500 hours is therefore	31s. 3d.
Cost of lamp	5 0
Total cost of 737 lumens for 1500 hours	36s. 3d.

At this rate total cost of lamp giving 1100 lumens for 1000 hours would be 36s. 1d.—an increase of 6s. 1d. over the cost of running at normal pressure.

2.	
Lamp operated at 10 p.ct. above rated voltage, and life reduced to	667 hours.
Light output would be increased	40 p.ct.
Lumens output is therefore	1540 lumens
10 p.ct. over-rating of lamps increases watts consumed by	17·5 p.ct.
Therefore, watts consumed by lamp =	117·5 watts.
Cost of energy for lamp giving 1540 lumens for 667 hours is therefore	19s. 6d.
Cost of lamp	5 0
Total cost of 1540 lumens for 667 hours	24s. 6d.

At this rate, total cost of lamp giving 1100 lumens for 1000 hours would be 27s. 11d.—a decrease of 2s. 1d. on the cost of running at normal pressure.

These results should show the futility of under-running lamps, and it cannot be too strongly emphasized that all lamps should be run at their rated voltage; especially is this so in the larger and more efficient types of lamps, where the loss becomes ever greater.

SWITCHING.

The control of street lighting in a town or city has always been a vexed problem. The use of lamplighters invariably resulting in:

1. Their commencing lighting up some considerable time before dusk, in order that the last lamp shall be lighted in time, thus causing a considerable waste of current which must be paid for, or
2. Certain lamps are not lighted in time.

This drawback in areas where the lamps are more or less congested is more emphasized in rural areas where the lighting covers long distances in all directions, and where it would generally be necessary for the lamplighter to traverse long roads twice before the whole installation was lighted. It is impossible in these days to conceive that individual switching can be justified on maintenance costs alone. Time switches are therefore universally resorted to to switch on and off automatically the whole of the lamps at predetermined times.

FITTINGS.

The choice of fittings suitable for street lighting by electricity is so wide that it is only necessary to lay-down certain principles which should be borne in mind.

1. They must be of robust design and weatherproof.
2. They must be well ventilated, as the normal life of the lamp will be shortened if it is run in a "hot" atmosphere.
3. They must be fitted with an easily adjusted focussing device.
4. They must be so arranged that the light rays are directed so as to obtain the best distribution of light.

The fittings should be fixed as high as possible to give the best results. Where large units of 300 watts (4300 lumens) are used, and mounted at (say) 25 to 30 ft. high, with spacing of 300 to 400 ft., with directional type reflection, the resulting illumination would be even and leave little to be desired. It is not possible, however, owing to the question of cost, for such large units as these to be installed in the type of district under consideration, and the unit favoured consists of a cast-iron back plate with a projecting arm carrying the cast-iron lantern some 2 ft. from the pole. It is fitted with a white vitreous enamelled iron reflector; and the distribution curve is shown in fig. 1.

Where expenses allow, an improved fitting to this can be used, comprising white enamelled reflector and a small prismatic refractor; the curve obtained from the use of the fitting being shown in fig. 2.

These fittings, being subjected to a considerable amount of vibration, should, in order to protect the lamp, be equipped with an anti-vibratory device, of which there are several on the market. The most efficient type of those adopted by the author consists of two concentric rays connected to one another by strips of phosphor-bronze gauze, which is very springy and which damps any vibrations that occur on the outer ring before they can reach the other. Each lamp should be fitted with a pair of fuses of "draw-out" pattern housed in a waterproof box easy of access.

In order to facilitate maintenance of the fitting, all iron or steel parts should be galvanized at the works before painting.

UNDERGROUND.

(1) The use of underground cable for street lighting schemes, while very desirable from many points of view, is almost out of question for the rural districts, owing to its prohibitive cost. Where it is unavoidable, the cable used is paper-insulated and

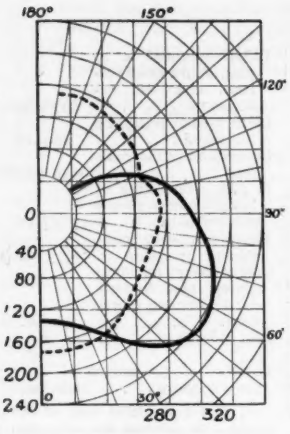


Fig. 1.

Dotted line = Bare gasfilled lamp.
Continuous line = Lamp with fitting.

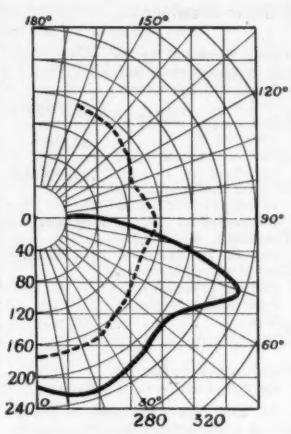


Fig. 2.

Dotted line = Bare gasfilled lamp.
Continuous line = Lamp and fitting

lead covered wrapped with hemp, jute served. This cable is laid direct in the ground, as far as possible under the curb, at a depth of 18 in., with creosoted wood cover board laid some 4 to 6 in. above it. The soil between the cover board and the cable should be specially selected to prevent sharp stones from being pressed into the lead covering.

Type of Network.	Average Cost per Yard of Network, including Switches, &c.	Average Cost per Lamp Spaced every 40 Yards.	Average Cost per Lamp Spaced every 80 Yards.
	s. d.	£ s. d.	£ s. d.
1. Underground cable—			
(*a*) Unmade ground	6 6	27 0 0	41 0 0
(*b*) Made ground	10 7	32 0 0	57 0 0
2. Using switch wire, and network neutral as return	2 5	8 2 0	12 8 0
3. Using separate network—			
(*a*) On existing poles	3 4	10 0 0	17 0 0
(*b*) Including cost of poles	6 4	15 10 0	28 10 0
4. Using 100-volt system—			
(*a*) On existing poles	2 7	8 6 0	13 7 0
(*b*) Including cost of poles	3 4	10 0 0	17 0 0

Overhead.

For reasons of economy, however, it is generally found impossible to put forward to rural district authorities an underground scheme for carrying-out street lighting.

The work in streets and roadways should be restricted to single poles; wood poles being used for straight line work and steel poles to take any big stresses due to terminations or angles, so as to avoid stays where inconvenient, and to minimize the use of ground space. Conductors should, wherever possible, be of standard copper of the size required. B.O.T. regulations call for all live wires above 125 volts to be guarded, and this is arranged by running a 7/16 S.W.G. galvanized steel catenary wire from pole to pole, and supporting therefrom guards.

A number of constructional details are given, following which the author suggested the reduction of the normal supply pressure of (say) 250 volts to a pressure of (say) 110 volts for street lighting purposes. The advantages gained in reducing the pressure are increased efficiency of the lamp, increased distribution value of the light, lower costs of running out network, and stronger lamps.

In conclusion, the author suggests that the attainment of adequately lighted rural roads is a desideratum to be most easily attained by the co-operation of supply authorities with the local authorities, who are usually not slow to appreciate that, by providing road lighting facilities, they are making possible, or at least more easily possible, the provision of facilities to cater also for the private lighting and, if desired, heating and/or cooking requirements of the individual ratepayer.

Discussion.

Mr. W. Bell, M.B.E. (Camberwell), said in regard to the difficulty of dealing with road surveyors, they had to remember that such surveyors were a good deal tied by the fact that their duty was to maintain good road surfaces, and their attention was largely concentrated on surface. The difficulty would be relieved if the Government gave grants towards road lighting on rural roads, as it was doing for road construction on main highways to-day. In regard to the table of costs, the difficulty to his mind was that with the 1540 lumens for 667 hours the lamp would be finished for that 24s. 6d., whereas in the other case they got 1500 hours at 36s. 3d., and the lamp was not finished. From the standpoint of the public the balance should be on the hours of production, because there would be two lamps as against one to buy. In his own borough the public lighting was all by gas, and he found in London that gas was a more economical proposition for public lighting than electricity, though he understood Mr. Lennox was working at a very cheap rate in Durham.

Mr. H. E. Fryer (Deputy Secretary of the Automobile Association) admitted that he knew nothing of the technicalities of public lighting, but urged the needs of the motorist on the roads at night. It was true that the average person did not appreciate public lighting as he ought. On the other hand, the President had himself admitted that there was still room for much improvement. It was possible road users might have some suggestions worth investigation by the engineers in charge of public lighting. He suggested that engineers would be doing valuable service if they could arrange the lighting of highways like the Great North Road, and many other big arterial roads, in such a way that there would not be the need for motorists to use glaring headlights, which were a nuisance to other road users. One noticed that few motorists used those headlights in well-lighted town streets, but in the darkness of the country they all had to use them. The most comfortable lighting for the motorist was that spread horizontally from shop windows, &c. It came from a direction at right angles to the line of travel, and by putting a relatively high light on one side of the object on the highway and the other side in shadow, the object was brought very clearly to notice. He thought the idea of a degree of more horizontal lighting instead of vertical on roads might be useful in showing up objects like the policeman, whether in white coat or not, and whether on a wet or dry road. It would be an advantage to have more lights, and at smaller intervals, along the highway, and something would be gained if the lights were back by the fence rather than on the edge of the curb. Light coming down vertically gave good illumination within a limited radius, but it did not necessarily carry to the next source of light. Two outstanding questions to his mind were whether the parish as a lighting unit was too small, and light for night driving particularly in outlying parts.

Mr. J. Christie (Electrical Engineer at Brighton) said most engineers were having to consider seriously this problem of overhead transmission of electric light in rural areas. Overhead lines seemed to be the only effective method of dealing with the problem, and Mr. Lennox's suggestions would be useful.

Mr. R. B. Mitchell (President of the Municipal Electrical Association) said the neat arrangement of overhead transmission explained by Mr. Lennox was worthy of being copied all over the country. He thought electric lighting in rural areas would be helped by the rapid extension of electricity supply even in rural areas now, and the poles for general supply could run along the roads and carry also the wires and lamps for lighting the roadway. He thought there ought to be some relaxation in Board of Trade regulations. While America went too far the other way, the rigidity of British regulations was a great handicap to development on grounds of cost.

Mr. A. C. Cramb (Borough Electrical Engineer, Croydon) thought that by altering the heights of the lamps on Mr. Lennox's system they might get better directional lighting. There was room for much improvement in directional lighting, and he thought the Institution might debate means of gathering up the rays of light up and down a road. The Ministry of Transport was doing splendid work on the roads, and the proper illumination of such roads was most important. Lighting in many places was appalling. In London there was great need for more uniformity by some system of co-ordination of lighting ideas. The Institution would do a fine work if it could put proposals on the subject before the Ministry of Transport.

Mr. W. J. Liberty (Secretary of the Institution and Lighting Superintendent in the City of London) said the position in London was due to there being some 30 different borough authorities, all with their own separate ideas of road lighting. This did not apply so much in other places, where there was only one authority in the district. It had been stated that in eight miles' motor run from Bow to Bayswater one could see 14 or 15 different lighting systems. There could not be system until there was co-ordination.

Mr. Leon Gaster (Illuminating Engineering Society and the National Safety First Council) remarked that road lighting had become a vital problem of national safety, and he did not think it would be so difficult to present a case for proper light control on the roads. He saw no reason why some of the revenue from motor taxation should not go to the cost of road lighting, and thought the public would not grumble. Engineers should get together all possible statistics of road accidents due to bad lighting or lack of lighting. Lighting engineers could work in conjunction with the local police in getting out figures, which would make a strong case for better and more uniform lighting. They must have something definite to put before the Government and the public. They should get the help of the Press, and show members of Finance Committees that they might themselves be the next victims of road accident. Every street accident should be the subject of close inquiry into causes. They could soon have public opinion behind the matter.

Mr. Lennox, replying to the discussion, said electric supply was spreading rapidly on the north-east coast, probably owing to Durham having only some comparatively small gas companies; but such companies were not slow, and were fighting hard for the public lighting load. If road lighting were taken up as a national affair and placed locally in the hands of road surveyors, their attitude to it would probably change materially. At present they looked on electric light poles as a curse on the roads. In the matter of costs of lamps, the saving he made of 2s. 1d. was more than would be the actual cost to replace the lamp. He was of opinion that motor headlights would remain a necessity for some years to come, even with lighting which would help to diminish the difference between great brightness and darkness. In his scheme he did, as far as possible, fix the lamps on the inside of the curb, to keep the glare from motorists. The Board of Trade regulations were a great handicap; and if the Electricity Commissioners would look on the matter from a broader standpoint it would be to the public benefit. He agreed with the need for co-ordination in lighting methods, and could not see why it should not be attainable, through the Ministry of Transport, even in London. He also agreed with Mr. Gaster as to the desirability of collecting statistics of the relationship of road accidents to lighting. In the matter of co-ordination the Institution might consider sending a petition to the Ministry of Transport.

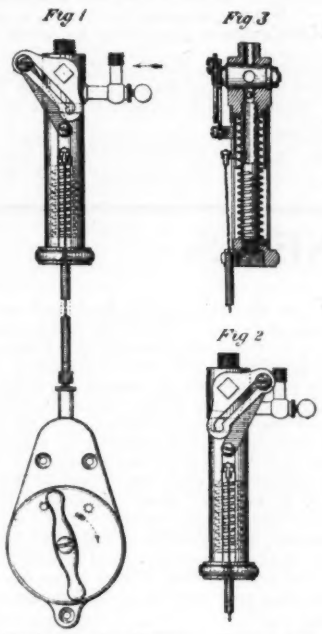
REGISTER OF PATENTS.

Distance Control of Gas Fittings.—No. 239,020.

EVERED & CO., LTD., of Smethwick, and GEE, A., of Handsworth.

No. 17,757; July 25, 1924. No. 6011; March 5, 1925.

This invention offers a means of direct mechanical control of the plug valve of gas appliances; a pilot light being required. The first claim is for "the provision in combination with the plug valve or cock of gas lighting or heating fittings or apparatus of a slotted member adapted to be rocked or turned for the purpose of operating the plug of the valve or cock, the slotted rocking member being linked to a spring pressed guided sliding member under the control of a Bowden or like flexible cable the manipulation of which effects the requisite operation of the valve or cock."



Switch Device for Gas Fittings.—Evered & Co., Ltd.

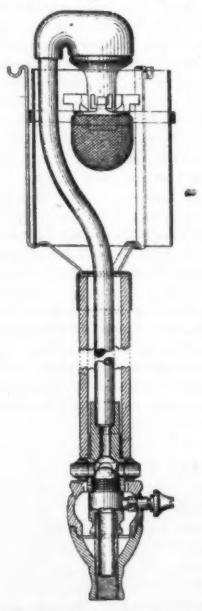
We reproduce a set of drawings of one form of the invention, from which the working is clear. Fig. 1 shows the apparatus in the turned-off position; fig. 2, turned-on; and fig. 3 is a section of the fitting looking in the direction of the arrow in fig. 1. It will be observed that the sliding member and spring are located in a tubular guide which is a continuation of the valve body of the fitting. Other designs of finger switches are described and illustrated in the specification.

Incandescent Gas Fittings.—No. 239,041.

EVERED & CO., LTD., and EVERED, S., both of Smethwick.

No. 20,252; Aug. 27, 1924.

This invention refers to incandescent gas fittings made in simulation of a candle. In fittings of this type an upright mantle has hitherto been used; and the present object is to employ an inverted mantle. A feature is that the portion of the fitting which surrounds the gas regulator is formed as two separable sections, the removal of the upper section whereof admits of ready access to the regulator.



A New "Candle" Fitting—Evered & Co., Ltd.

We reproduce a part-sectional elevation of the fitting.

The fitting comprises a socketed tubular union adapted to be screwed on to the gas pipe; a threaded extension in the interior of the union being adapted for connection to the gas regulator, which is of the known type embodying a reciprocable needle for controlling the gas jet, the regulator being operated by means of a rotatable knob mounted on an arm projecting from the burner. Surrounding the regulator is a tubular section provided with an open-ended slot adapted to engage the projecting arm of the regulator and provided with a shouldered collar at its base. The tubular section is adapted to receive the lower part of a bunsen tube. Surrounding the apertured section of the bunsen tube is a milled rotatable split ring which is provided with a plurality of apertures.

Mounted on the upper section of the bunsen tube is a porcelain tube which constitutes the candle section of the fitting; this porcelain tube being provided with a split metal liner which engages the upper section of the bunsen tube, and a metal shade-carrier being arranged on its upper end.

The form of the remainder of the fitting is clear from the drawing.

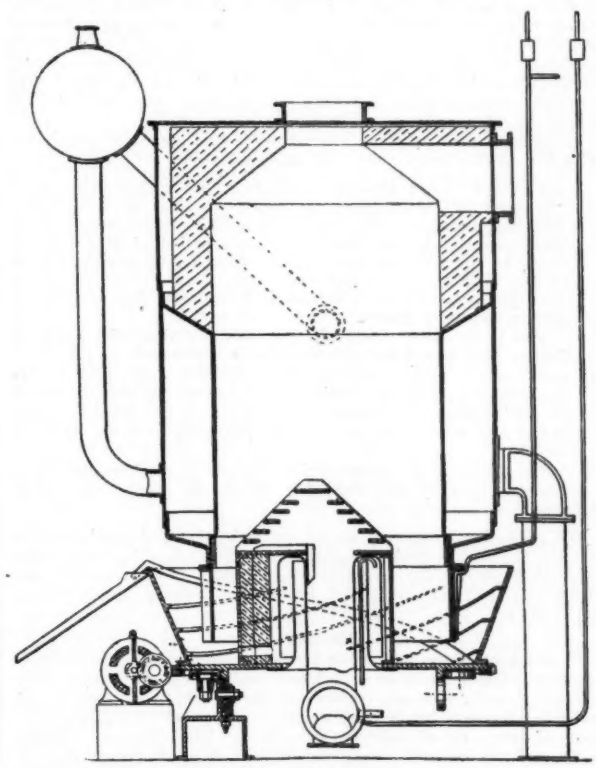
Self-Clinkering and Self-Steaming Water Gas Generators.—No. 238,987.

HUMPHREYS & GLASGOW, LTD., and GLASGOW, A. G., both of Victoria Street, S.W. 1.

No. 14,744; June 18, 1924.

The object of this invention is to provide a safe and efficient self-clinkering and self-steaming water gas generator wherein there is no manual labour for barring down or clinkering, nor any loss of cooling water or of heat therein, while the means of automatically attaining these ends provides the generator with low-pressure steam suitable for the generation of the water gas but not in excess of the requirements of the generator.

The patentees state that they have by convincing trials determined, in the first place, that an annular metal vessel operating as a steam boiler can be utilized, in connection with a mechanical grate structure supporting a deep fuel bed, to prevent clinker from adhering to the walls of the generator or arching over the grate, and to cause the clinker and ash to travel evenly to the bottom of the fuel bed; secondly, they have by further trials demonstrated that all the clinker and ash, instead of accumulating at the bottom of the fuel bed, can be automatically and continuously discharged with low carbon content as they reach the bottom; and thirdly, they have discovered and corroborated by continued experiment that a water gas generator and safe low-pressure steam generator can be combined so that the steam space is never in contact with the fuel bed



Self-Clinkering and Self-Steaming Water Gas Generator.—Humphreys & Glasgow Ltd.

or blast or water gases, the production of steam does not exceed that needed for the generator (thus permitting the economic use of very low pressures), and the temperature of the top of the fuel bed is not reduced below that necessary for ready ignition of the issuing

blast gases—all without any interference whatever with the efficiency of the automatic self-clinkering operations.

According to the present invention, there is embodied in the generator an annular water vessel surrounding the lower portion of the fuel bed, including the clinker adhesion zone—the height of which is easily found, being definitely determined by the character of the fuel in use, and the rates and times of blasting and steaming required for the efficient use of such fuel. The extent of the inner wall of the boiler above the clinker zone is so limited that the generation of steam does not exceed that required by the generator, and the heat of the upper portion of the fuel bed is not so reduced that the temperature of the issuing blast gases will be less than that required for ready ignition for utilization. The surface of the inner wall of the water vessel is set substantially vertical, and is free of any projections which would prevent descent of the clinker. The boiler, of which this vessel forms the heated water space, is provided with means for collecting the steam and conducting it to the generator in the required quantity and preferably at a low pressure; and the generator is provided with a mechanically actuated grate.

We reproduce a vertical section of one form of generator, from which the main features of the invention may be understood. The specification describes all these in detail.

It will be noticed that the steam-collecting vessel of the boiler and the water and steam pipes are self-supporting, and that the upper face of the annular water space is sloped so as to minimize wear. The clinker is crushed and pressed down owing to the eccentric setting of the grate; any small ashes which pass into the cone being cleared into the central blast passage by a scraper. Below the grate is indicated a pyrometer, which enables the operator to know whether clearing is taking place at the suitable rate. Depending plates seal in water the blast passage; and this seal is in connection with that in the ashpan. The latter is provided with inclined ribs which work the ash and clinker up a discharging plough.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Sept. 30.]
Nos. 23,449-24,069.

Carpmael, W. P.—See Crown Cork & Seal Company of Baltimore City. No. 23,558.

Crown Cork & Seal Company of Baltimore City.—"Apparatus for gas-treating composition cork discs, &c." No. 23,558.

Frankl, M.—"Water gas generator." No. 23,748.

Gay, R.—"Manufacture of gas retorts, &c., from clay, &c." No. 23,858.

Gibbons (Dudley), Ltd.—See Gay, R. No. 23,858.

Naamlooze Vennootschap Silica Ovenbouw Maatschappij.—"Method of operating vertical chamber ovens to produce water gas." No. 23,767.

Saunders, C. C.—"Automatic safety gas valve." No. 23,627.

Savory, C. B.—See Saunders, C. C. No. 23,627.

Toogood, H. J.—"Manufacture of coal gas." No. 23,599.

MISCELLANEOUS NEWS.

BRITISH GAS LIGHT COMPANY, LTD.

Annual General Meeting.

The Annual General Meeting of the Company was held on Wednesday, Sept. 30, at the London Offices, No. 2, The Abbey Garden, Westminster, S.W. 1—Mr. Henry Woodall, the Chairman of the Company, presiding.

The Secretary (Mr. A. W. Brookes) read the notice convening the meeting and the Auditors' reports.

The report of the Directors and the statement of accounts for the year ended June 30 were taken as read.

The Chairman, addressing the meeting, said: Before referring to the accounts, there is one matter I must mention. We, the Directors, and you, the shareholders, have suffered a great loss in the resignation of our revered Director, Mr. Frederick Wilkin. Mr. Wilkin was a delightful colleague, and rendered splendid service to the Company for a period of fifty years. As you know, Mr. Wilkin's father was one of the original Directors of the Company; and between them they served us continuously for a period of a hundred years—a record of which we have every reason to be proud and grateful. We are fortunate in having Mr. Graham Wilkin, a nephew of Mr. Frederick Wilkin, as a Director in his uncle's place. We cordially welcome him, and have no doubt he will maintain the family tradition of long and faithful service.

I should like to read you the resolution we passed in connection with Mr. Wilkin's retirement. It is as follows:

> *Resolved:* That the Court of Directors accept with great reluctance and very deep regret the resignation of their highly-esteemed colleague Mr. Frederick Wilkin, the importance of whose services to the Company over a period of fifty years it would be difficult to exaggerate. In being deprived of the benefit of Mr. Wilkin's advice and experience, the Directors recognize that they are suffering a serious loss, and feel they are parting with a very dear friend.
>
> The Court have always in remembrance that Mr. Wilkin's father, Mr. John Wilkin, one of the first Directors of the Company, was a member of the Court for fifty years prior to his son's election, and they desire to place on record the completion of one hundred years' continuous service on the Directorate by father and son—an experience probably unique in the business world.
>
> The Directors greatly appreciate the gift of the beautiful silver cup presented by Mr. Frederick Wilkin to commemorate this event.

The resolution, engrossed on vellum and suitably framed, will be sent to Mr. Wilkin, and a replica will be hung in this room. We have tried, on various occasions, to get Mr. Wilkin to have his portrait painted, for our Board Room, but nothing would induce him to do so.

ACCOUNTS.

The accounts show that, after providing for income-tax, debenture interest, and preference stock dividend, and paying the interim dividend of 3½ p.ct., less tax, on the ordinary stock, there remains an available balance of profit of £68,657, as compared with £73,434 on June 30, 1924—or a reduction of £4777. The Directors propose to pay a final dividend on the ordinary stock at the same rate as last year—namely, 4 p.ct., less tax, making 7½ p.ct. for the year. Owing to the reduction in rate of income-tax, the net amount of the final dividend will be £26,932, as compared with £26,505 last year—an increase of £427. The balance to be carried forward will therefore be further reduced by this sum; the actual amount being £41,725, as compared with £46,929, or a total reduction of £5204. Against this it will be noticed that the general reserve fund (London) has been increased by £2105; and this fund now amounts to £65,812. I would remind you that this reserve fund, and our other reserve funds are real reserves; the investments being made outside the Company—in fact, in Government securities. I am not overlooking the fact that, in order to produce such satisfactory figures in what has been generally a bad year for gas companies, it has been necessary to withdraw £21,339 from the Hull reserve fund; but I will refer again to this when dealing with the accounts of the Hull Station.

In my address last year I mentioned that, to mark the Company's centenary, it was the intention of the Directors to introduce this year a pensions scheme for workmen. The scheme was put into operation on Jan. 1, and has given general satisfaction. I also referred to the fact that a short history of the Company was in course of preparation. The booklet was issued just before Christmas, a copy being sent to every stockholder and debenture holder. It is gratifying to be able to report that several letters have been received at this office expressing appreciation of the little work and the style of its production.

HULL.

At Hull the sales of gas for the year were 120 million c.ft. more than in 1924. A further 5000 tons of coal were carbonized, but the residual products yielded £23,000 less; the loss on coke being about £6000, and on tar products £17,000. The cost of coal and manufacturing charges was £26,000 more than last year. These two items, together with the reduced price of gas, account for the large fall in profit. The profit in 1924 was considerably in excess of the authorized Parliamentary interest, and enabled us to fill up the Hull reserve fund account to the maximum—namely, £70,500. This year, in order to make up the Parliamentary interest, we have withdrawn £21,339 from the fund, the balance of which is now £50,282, and we hope soon to be able again to build it up to the maximum. Owing to the fall in profit, the Directors had to raise the price of gas on April 1 from 7d. to 8d. per therm. As you know, the policy of the Company has always been to sell gas at a low price, and the gradual reductions made from the high prices necessary during the war period were apparently justified. It is only the very serious slump in the price of residuals which has now necessitated the increase in the price of gas. Now that the deferred renewals are completed, we are getting much better carbonizing results, and we shall take the earliest opportunity of reducing the price. This must, however, depend on the net cost of coal.

The sales of gas have continued to increase in Hull, in spite of the higher price; and the total quantity sold in the year under review was 1775 million c.ft. This includes about 70 million c.ft. sold in bulk to the Corporation; the price charged for this supply since March 31, 1924, having been 6d. per therm. This has not been advanced. The new showrooms were completed, and we were able to obtain possession of the whole premises before the end of last year. The sale of stoves and fittings has been greatly stimulated, and the organization by Mr. Copp of series of cookery lectures and demonstrations has proved a great success. Additional workshops and stores are in course of erection behind the offices and workshops in Baker Street. When the buildings are completed, the Company will have ample accommodation, as the premises extend as far as Wright Street, which is parallel with Baker Street. The principal entrance to the workshops will then be from Wright Street. This will enable us to close the old stove shops; and all the work will be done under one roof, and so make for economy.

NORWICH.

The profit at this station, I am sorry to say, is £13,000 less than in the year ended June, 1924. The yield from residual products was £5500 less than last year, and in the year under review very large expenditure has been incurred in renewing and enlarging mains and services and in repairing and refitting gas stoves and other heating apparatus. These distribution charges have amounted to £10,000 more than the normal expenditure under this heading. With regard to the enlargements of mains, some of these have been necessary for the supply of gas to new housing estates where at

present only a few houses are completed and occupied; but we shall feel the benefit of the increased sales in the near future. An exceptionally large number of old cooking stoves have been brought up-to-date, and the heavy revenue charge is not likely to recur—at least for many years to come. I have referred more than once in previous reports to other heavy charges which the Norwich Station has had to bear during the last five or six years on account of the large alterations and extensions which have been carried out at the Palace Station Works. The total revenue charge is £80,415, and I am glad to be able to state that £70,000 has now been written off, and there only remains the balance of £10,415, which I hope we shall soon be able to dispose of. With these exceptional charges it is not surprising that the station has not been able to earn its authorized Parliamentary interest; and, though we are nearing the end of these heavy costs, the Directors have, with great reluctance, come to the conclusion that it is necessary to increase the price of gas, especially bearing in mind the continued depression in the coke and tar products markets. Notice has therefore been given that the price of gas will be raised from 11d. to 1s. per therm at the end of the Michaelmas quarter. Two years ago we opened an additional showroom in Magdalen Road, and we have recently acquired some premises in an excellent position at the corner of Dereham Road for a second district showroom, the plans for which are now under consideration by the Directors. You will have observed from the Directors' report that we have purchased the Wymondham gas undertaking, with a view to incorporating it with the Norwich Station. It is only a small affair; but as soon as the amalgamation can be effected we shall be able to develop Wymondham, and considerably increase the sales of gas there. In addition to the growing demand for gas at Wymondham, there is a fair amount of business to be picked up on the way, which in a short time we expect will pay interest on the cost of the main from Norwich to Wymondham now being laid.

TROWBRIDGE.

The results at this station may be regarded as satisfactory, as the actual profit is only £110 less than the authorized Parliamentary interest after writing off £1940, the balance of the suspense account, for alterations and extensions. The Directors' report informs you that the Board of Trade granted on June 18 a Special Order under section 10 of the Gas Regulation Act, empowering the Company to expend additional capital at Trowbridge, and for other purposes. The capital figures are: Ordinary, £27,375; borrowed money, £9125. You will also have noticed that we have purchased almost all the stock of the Bradford-on-Avon Gas Company with a view to eventually applying for authority to combine the undertaking with the Trowbridge Station.

HOLYWELL.

The profit at this station is £1169, or £209 less than last year; the difference being entirely accounted for by the fall in the value of residual products.

SWANAGE.

At Swanage, where we hold the bulk of the capital, the installation of modern gas manufacturing plant, and the erection of an up-to-date electrical generating station on the site of the gas-works, to which I referred last year, are now completed, and the Company is in a position to meet the requirements of its growing business. The sales of gas show a very satisfactory increase—namely, 10·64 p.ct. for the half-year ended June 30. A large number of applicants for electric current, who could not be given a supply until the new plant was installed, have now been connected up, with the result that the sales of electricity have very largely increased. As regards finance, a considerable amount has to be charged against revenue in respect of the replacement of obsolete plant. On the other hand, the reduction of manufacturing charges, the economies resulting from the combined working and management of the joint undertaking, and the continually increasing consumption of gas and electricity, should enable the cost of interest and dividends to be easily met. Those of you who know the district will have noticed that a very fine road is being built, connected with a ferry, from Bournemouth to Swanage, and this will lessen the distance between the two places by more than a half. It will also open up a beautiful piece of country—namely, Studland—where the Company has Parliamentary powers, so that there are prospects of considerable extensions in that district.

In conclusion, I think that the position is one with which we can be reasonably satisfied. There has, as you know, been a great deal of electrical propaganda of late, and wonderful prophecies of what electricity can do for the well-being of the nation. Various suggestions have been made as to subsidies to be given by the Government; but the gas industry has not been idle, and many of the assumptions of the advocates of electricity have been shown to be without foundation. We are greatly indebted to Mr. Milne Watson, the President of the National Gas Council, for his excellent addresses and for his spirited support of our claims as necessary, useful, and efficient public servants. I think we need have no fear, as our case is a perfectly sound one, and is being most ably handled and advocated. With regard to the Government subsidy to the coal industry, I can only say that it seems to be a dangerous policy. Perhaps in the expensive end it will prove a benefit, as I imagine it will show that subsidies are unwise and uneconomic, and there should be no extension of the practice. We shall watch carefully and with some anxiety the proceedings before the Royal Commission on Coal. The gas industry is fully alive to the position, and will be prepared at the proper time to give evidence before the Commission. Although we have had a war and a great upheaval, the laws of supply and demand are unalterable; and though we can artificially raise prices and wages for a time, in the end we can only give value for value received.

Discussion of the report and accounts was then invited.

Mr. W. J. LIBERTY said the Chairman had stated that the price of the Company's gas in Hull had been raised from 7d. to 8d. per therm, and that the Company were selling to the municipality, in bulk, at 6d. He asked at what price the Corporation were selling in their area.

The CHAIRMAN replied that the price of gas supplied by the Company was generally slightly below that supplied by the Corporation. He pointed out, however, that the Corporation had a big capital. They had bought-out the old company, and had closed the works, and had a large amount of interest to pay.

There being no further discussion,

The CHAIRMAN formally moved the adoption of the report and accounts.

Major-General WILLIAM T. CORRIE seconded.

The report and accounts were adopted unanimously.

THE DIVIDEND.

The CHAIRMAN proposed that the payment by the Directors of the dividend at the rate of 7 p.ct. per annum, less income-tax, on the cumulative preference stock of the Company be confirmed.

Major-General CORRIE seconded, and the proposal was carried unanimously.

The CHAIRMAN proposed that the payment by the Directors of the interim dividend at the rate of 3½ p.ct., less income-tax, on the ordinary stock, be confirmed, and that a final dividend on the ordinary stock at the rate of 4 p.ct., less income-tax, making 7½ p.ct. for the year, be declared, the same to be payable on Oct. 9.

Major-General CORRIE seconded; and the proposal was carried unanimously.

RE-ELECTIONS.

The CHAIRMAN said it was his pleasure and privilege to propose the re-election of Mr. L. R. Abbey-Williams as a Director of the Company. Those who attended the general meetings had been accustomed to see Mr. Abbey-Williams in his place; and he attended not only those meetings, but all the meetings most regularly. The Directors were very glad to have him as a colleague.

Mr. HAROLD G. PALMER seconded; and the proposal was carried unanimously.

Mr. L. R. ABBEY-WILLIAMS briefly responded.

The CHAIRMAN then proposed the re-election of Mr. Graham Wilkin as a Director. He knew that Mr. Frederick Wilkin, whose resignation they so greatly deplored, was anxious that Mr. Graham Wilkin should follow him, and he (the Chairman) was sure they would all feel that a Director bearing the name of Wilkin should always, if possible, remain on the Board. Mr. Graham Wilkin was known to all the Directors, he attended the meetings constantly, had taken great interest in the affairs of the Company, and was also a holder of a considerable amount of stock.

Mr. HENRY PULLMAN, J.P., said it was with mixed feelings that he seconded the resolution for the re-election of—or the confirmation of the election of—their new colleague, Mr. Graham Wilkin. They all regretted the resignation of their old and esteemed friend and colleague, Mr. Frederick Wilkin, but it was with a feeling of satisfaction and pleasure that he was able to second the re-election of one whose friendship he had enjoyed for many years. He assured the meeting that no better choice could have been made. Mr. Graham Wilkin was a distinguished business man, and would be an acquisition to the Board.

The motion was carried unanimously.

Mr. GRAHAM WILKIN expressed his thanks for the kind remarks which had been made about his predecessors. He would endeavour to serve the Company as well and as faithfully as they had done.

Mr. E. Knowles Corrie and Mr. William Cash, F.C.A. (on the motion of Lieut.-Colonel W. F. T. CORRIE, D.S.O., seconded by Mr. C. A. MORGAN), were appointed Auditors of the Company until the next annual general meeting, at a net remuneration, after deducting income-tax, of £200 per annum each.

VOTES OF THANKS.

Mr. F. R. W. SLY proposed a vote of thanks to the Chairman and Directors for their able management of the business of the Company.

Mr. W. E. PRICE, seconding, said that of late he had been somewhat in contact with the Directors and the officials of the Company, and as a result he was firmly convinced that the Directors were the right men for the job. They were assiduous in all the work they did, and, as a stockholder, he congratulated himself that the business of the Company was in such able hands.

The resolution was carried unanimously.

The CHAIRMAN, responding, said that his colleagues and himself thoroughly enjoyed their work, because they had such an able staff and such appreciative shareholders.

Proposing a vote of thanks to the Secretary, officers, staffs, and workmen, he said the work of those in the gas industry had not been too easy during the last twelve months. The policy of the Directors of the Company was to keep the price of gas as low as possible, and the result was that at the big stations the Company had not earned the amount of money which was necessary to pay the interest allowed by Parliament. This, of course, always made it hard for the engineers and others, who were doing their best and yet felt that they were not quite doing all that might be expected of them. But the Directors did not feel that; they knew that the Secretary, officers, staffs, and workpeople had done their work well, and were doing their best, and that all the staff were conscious that every economy must be effected. What had upset calculations more than anything else was the serious fall in the price of residuals. But the Company was well served, and they were all working together, and he was sure that they would be able to carry on their payment of a good and reasonable dividend. The work at the central office was strenuous. The Company was a unique one, having a large number of undertakings which all appealed to the central office for advice and help. Mr. Brookes, the Secretary, was in his forty-eighth year of service, and, speaking for himself and his colleagues, he had their fullest confidence. Referring to the workmen, he said the Company had a

good and, he believed, a contented lot of men, and, in conclusion, he thanked them for the work they had done.

Mr. W. J. Liberty, seconding, said he did not think they need be fearful of the future after what they had heard about the staff.

The vote of thanks was carried with acclamation.

The Secretary, acknowledging the vote, said that all concerned appreciated this recognition of their services. On behalf of the officials generally, he expressed regret at Mr. Frederick Wilkin's resignation from the Directorate. Mr. Wilkin was admired by them all, and they, too, looked upon him as a friend, and subscribed to the hope that he would long enjoy his retirement.

Mr. Thomas Glover (Engineer at the Norwich Station) also acknowledged the vote and, from his experience, re-affirmed the Chairman's remarks that the workmen were comfortable. They all appreciated the Chairman's interest in the staff and workmen when he visited the stations.

The proceedings then terminated.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Half-Yearly Meeting.

The Half-Yearly Meeting of the Company was held on Sept. 30—Mr. Francis J. Dickens (Chairman) presiding.

The Chairman, in moving the adoption of the report, said he was glad to be able to submit for consideration figures of such a satisfactory nature, indicating clearly the continued progress made by the Company. Undoubtedly, the outstanding features were an increase of no less than 12 p.ct. in the total quantity of gas sold, and the maintaining of the unaccounted-for gas at a figure comparing favourably with other undertakings. To some extent, of course, this large increase in sales was discounted by the strike which occurred in May, 1924; but even when the comparison was made with the corresponding period of 1923, it would be found that the output was up by well over 9 p.ct.—or, expressed in terms of cubic feet, by 140 millions in the year. A commencement had been made with the Government's electrical scheme. Apparently the truth was that electricity, being unable, in the face of free competition with gas, to make the headway it desired, had now to secure financial assistance from the taxpayer. As this principle had been adopted, it was surely only fair and equitable that the claim of the gas industry for national assistance should be recognized, to recompense it for the loss of profits which was incurred during the war, owing to the operation of obsolete sliding-scales under which gas companies were compelled to work. It was, perhaps, not fully recognized that the gas industry was one of the most important key industries in the country.

Accounts.

Turning to the accounts, he observed that the capital expenditure on this occasion was heavier than usual, which might be regarded as a healthy sign, indicating, as it did to some degree, the large extension which was taking place in the Company's business. The actual amount expended totalled £12,120, while the sales, depreciation, and credits amounted only to £3622. Consequently the total expenditure was increased by roughly £8500. It would interest them to know that during the half-year under review they secured 1587 new consumers, while no less than 1017 new services were laid. There were 1609 new cooking stoves and 674 heating appliances sent out, a large proportion of which were actually sold outright to consumers. Coal and oil, as well as purification, had cost slightly more, but the increases were normal and called for no special comment. Considerable progress had been made with their programme of repairs and renewals at the works; and it was therefore not surprising to find a comparatively large increase under this head, amounting to just over £10,000. Their programme was not yet complete, but they believed the end was in sight, so that, if the fall in residual prices was not too severe, it might be possible during next year to effect a further reduction in the price of gas. At any rate, whether they succeeded in this respect or not, no effort would be spared to avoid the necessity of increasing the price. The total cost of distribution of gas was larger by nearly £2000. There was an increase under the head of repairs to mains and services of rather more than £3000, and this was due, as he explained on a previous occasion, to the special examination of consumers' service pipes which was still being carried on and was undoubtedly justifying the expense involved. The cost of repairing meters was less by £2625, notwithstanding the fact that substantially more meters were repaired in their own shop. Repairing stoves had cost more, owing to the almost unprecedented demand for these appliances. The results in connection with the maintenance of public lamps showed a slight improvement on the corresponding period, but rates and taxes still remained as heavy as before. Management and miscellaneous and special charges were about the same, and called for no special comment. On the income side, owing to the largely increased sales of gas, net receipts were greater by nearly £18,000. There was also a corresponding improvement in the rental figures. The income from residual products was almost identical with that of a year ago, in spite of the serious fall in prices, and they certainly regarded the results as satisfactory, reflecting great credit on the respective sales departments.

Balance-Sheet.

To sum up, their income for the half-year was greater by £21,434, while expenditure had increased to the extent of £14,789; and thus they were able to carry into net revenue a profit larger by £6645. The net profit available, after meeting interest charges, enabled the maximum statutory dividend of 6¼ p.ct., based on the present price of gas, to be paid, leaving a balance of just over £10,000 to be carried forward to the next account. The balance-sheet disclosed a satisfactory state of affairs. The funds showed a further increase of over £20,000, while liabilities to tradesmen and others were down slightly. Stocks were less, but debtors had increased, owing to the larger business done.

It only remained for him to say that there appeared to be every reason for confidence in the Company's prospects.

Double Taxation.

With regard to double taxation, there was little to report, but some progress had certainly been made. The Chancellor of the Exchequer had recently informed them that negotiations covering the whole field of double taxation between Great Britain and the Irish Free State were now proceeding, and that it was hoped that new arrangements would take effect as from the beginning of the coming financial year. These, they trusted, would prove satisfactory in practice, and would remove the hardships from which so many stockholders had suffered during the last two years.

The motion was seconded by Mr. Davies.

Shareholders Satisfied.

Mr. R. J. Kelly, K.C., speaking for the shareholders present, expressed satisfaction with the Chairman's statement and with the report submitted. They were specially gratified at the prospect of relief in the matter of double taxation.

The report and statement of accounts were then adopted.

Dividend.

On the motion of the Chairman, seconded by Mr. Bond, the meeting declared the maximum statutory dividend on the consolidated ordinary stock of the Company, at the rate of £6 5s. p.ct. per annum, less income-tax.

Thanks to Directors and Staff.

Mr. Kelly moved a vote of thanks to the Directors and staff, paying a high tribute to the manner in which the affairs of the Company were conducted.

The motion was seconded by Captain Purcell, and acknowledged by the Chairman.

This concluded the meeting.

LUTON GAS COMPANY.

At the Half-Yearly Meeting of the Company last week, the Directors reported that the quantity of gas sold during the six months was slightly less (2·12 p.ct.) than for the corresponding half of last year, but 6¼ p.ct. greater than in the June half of 1923. In view of this decrease, and the fact that residuals had not yielded so much, the Directors were compelled to announce an increase of price from the Michaelmas readings to 8⅝d. per therm, or 3s. 5·16d. per 1000 c.ft. In February last the Directors invited tenders for £20,000 of 5 p.ct. perpetual debenture stock at a minimum price of £97 per £100. Tenders for £52,740 were received; and the average price realized was £98 11s. 4d. p.ct. In June 2000 new ordinary shares, Class F, of £10 each, were offered for sale by auction, and 1252 were disposed of at an average price of £12 4s. Most of the remaining shares have since been purchased at the reserve price of £12. The proposed dividends, the Directors reported, would absorb £4250, and leave a balance to the credit of revenue account of £6562.

The Chairman (Mr. J. W. Green) said there was nothing to be alarmed about; and the public should not grumble at being asked to pay 8⅝d. per therm. Residuals had been gradually falling in value. Rates and taxes were £1360 more, and there was an increase of £1000 in wages. As an employer, he did not see how wages could be decreased unless there was a reduction in the cost of living. Mr. Green also referred to the large sums of money being spent on plant, and said they hoped to have the extension of the vertical retorts, with waste-heat boiler, in work before Christmas. These improvements would effect considerable saving in the cost of manufacture.

The Chairman and Directors, Manager and Engineer (Mr. William Phillips), and employees were thanked.

Specialists and Libraries.

The idea of providing an opportunity for intercourse between those engaged in assembling and distributing information in the fields of science, industry, and public affairs has met with an astonishing success, under the auspices of the Association of Special Libraries and Information Bureaux. Sir Arthur Steel-Maitland, Bart., Minister of Labour, opened a conference at Balliol College, Oxford, which lasted from Sept. 25 to 28, and was attended by over 200 delegates of organizations ranging from the scientific societies and large libraries, to research institutes and smaller associations of experts, in the aggregate probably representing more than half-a-million intellectual workers. Dr. Chalmers Mitchell, F.R.S., spoke of the "World List of Scientific Periodicals" which has just been published with the help of the British Museum authorities, and which discloses the existence of some 25,000 separate journals, and for the first time gives a picture of the situation, which is truly staggering. Organization, co-operation, and the initiation of methods of exchange are obviously desirable to keep the community in touch with world sources of information of such gigantic dimensions. The problems of translation and collective abstracting were dealt with in papers by several of the leading authorities in the engineering and chemical sciences. An attempt was made to give the conference some insight into the library methods of the Daily and Technical Press, as it is obvious that those who are engaged in handling written matter for more private distribution and service should find interest in the methods employed in the field of journalism.

At a meeting of the Lytham St. Anne's Council on Sept. 28, Alderman Whittle said the new holder had cost £25,928, and there had been a saving to the borough of about £7000 through a Government grant.

CONTINENTAL UNION GAS COMPANY, LTD.

The Ordinary General Meeting of the Company was held on Tuesday, Sept. 29, 1925, at Winchester House, Old Broad Street, E.C.—Colonel H. LEROY-LEWIS, C.B., C.M.G., D.S.O., in the chair.

The SECRETARY (Mr. Arthur Nops) read the notice convening the meeting and the Auditors' report; and the report of the Directors and the statement of accounts were taken as read.

The CHAIRMAN: Ladies and Gentlemen,—I propose to make a few remarks upon the affairs of the Company during the past financial year; and, at the conclusion of my address, I hope any shareholder who wishes to ask questions, or who may feel aggrieved at receiving a dividend for the first time for ten years, will take that opportunity of intervening.

ALTERATION IN DATE OF MEETING.

Those of you who have been in the habit of attending our annual general meetings will no doubt have felt some surprise at being summoned this year in the month of September, instead of in December, in which month our general meetings have been held ever since 1876. The December date was rendered necessary in the old days by our custom of bringing into our working year the dividends earned during that same period by our holding in the Union des Gaz. As a consequence of this custom, we were unable to close our accounts for any year until after the Union des Gaz had held their meeting and declared their dividend—usually in November. This was not a thoroughly sound procedure, and its disadvantages were brought home to us by the unfortunate complications which arose in 1914, when we, as usual, brought into account the dividend declared by the Union des Gaz. This dividend, though declared, was not paid (owing to the circumstances of the war) until January, 1921, by which time the value of the franc had dwindled to 60 to the pound, so that our £30,000 of dividend had become £12,500. The consequent complications—and especially our endless arguments with the Income-Tax Authorities on the matter—led us to see the error of our ways. Ever since, our yearly accounts have included only interest and dividends actually received during the year, so that there is now no object in asking you to wait until nearly Christmas before we make our report for the year ending on June 30.

THE ACCOUNTS.

I now beg leave to move that the report and accounts be adopted. I shall first refer, item by item, to the figures now before you. The first debit to our profit and loss account is management expenses, which, though showing a slight increase, still remain extraordinarily low for the administration of a million of capital. Provision for income-tax is increased from £3000 to £4000. This provision is required to meet the tax eventually payable on the dividends and interest received (chiefly Union des Gaz dividends) which have not already suffered tax by deduction at source. As I explained last year, an increase in the amount charged to our profit and loss account under this head is an excellent sign, as it can only be a corollary to an increase in the amount of the Union des Gaz dividend brought in on the other side. The increase is really larger than would at first sight appear, as the provision now made is at the new rate of 4s. in the pound, whereas the figure of last year was calculated at 4s. 6d.

EXCHANGE RESERVE.

The next item is exchange reserve. It was felt by the Board—and I am sure you will all agree—that, as long as the franc remains at the figure at which it has stood of recent years, it would be only prudent to build up a fund to counteract the depreciation of our French investments. Effect has been given to this idea for some years now, with the approval of the stockholders, and in pursuance of this policy, a sum has been allotted out of this year's profits of £6000—the same figure as last year—making a total of £25,984 to the credit of that account. On the credit side of the profit and loss account it will be noticed that the 7 p.ct. dividend on the preference stock absorbed £10,850 of the previous balance of £12,890—leaving a carry forward of £2040. Dividends and interest received during the year increased from £23,058 to £36,261. This substantial increase is due to our having received three distributions from the Union des Gaz. That Company is at present changing over from a July-June working year to a January-December working year. To effect this change, between July, 1924, and December, 1925, they are having two working years of nine months each. Thus in our period of twelve months we received from the Union des Gaz not only the interim and final dividends of their year 1923-24, but also an interim distribution for their nine months' period 1924-25. It may be argued that this is exceptional, as the receipt of three distributions will only occur during this period of change-over; but I do not anticipate that the total amount of our annual receipts from this source will show any diminution, even when the normal two distributions per annum are resumed. I shall refer again to the subject of the Union des Gaz. Our refund of income-tax on management expenses is practically the same figure as last year. Our sundry receipts—transfer fees, &c.—have advanced from £38 to £54, a mark of increased interest in our stock by investors.

DISTRIBUTION ON ORDINARY STOCK.

There remains a balance available of £25,744 0s. 2d. to the credit of profit and loss account, which is nearly double that of last year. On the 3rd of July an interim distribution of 3½ p.ct., less tax, was made on the preference stock. The Board now propose paying a further 3½ p.ct. less tax (making the full 7 p.ct.), and also recommend a dividend for the year of 2 p ct., less tax, on the ordinary stock, payable on Oct. 5 next. It is hoped that henceforth we shall be able to make April the regular month for our interim payments, and October for our final dividends. This change follows on the alteration in the date of our general meeting, the reasons for which I have already explained. This proposed distribution on the ordinary stock marks an epoch in our gradually returning prosperity. In 1915, for reasons with which we are only too familiar, all our dividend payments were perforce suspended. We were able to make a new start by paying 3 p.ct. on our preference stock for 1920-1; for 1921-2 we paid 4 p.ct. on our preference stock; for 1922-3, 7 p.ct.; and for 1923-4, again 7 p.ct.—the maximum to which the preference stock is entitled. A resumption of ordinary dividends—however small—is evidence that our position is not stationary. We are making gradual progress towards prosperity; and I have every hope that our results will continue for some time to improve from year to year.

THE BALANCE-SHEET.

Turning now to the balance-sheet, the first item—capital—remains, of course, unaltered. Sundry credit balances have advanced considerably since last year. The principal item among these balances is our exchange reserve, which has been increased, first, by the allotment of £6000 out of our revenue, as shown in the profit and loss account, and, secondly, by the amount of surplus over book value on the sale of certain of our securities. With regard to this latter point, I explained to you last year our policy of disposing of our holdings in certain small provincial gas companies—investments excellent in their way, but not freely marketable; and therefore not an ideal class of investment for a company such as ours. This policy has now been carried to completion. The only other items of importance among the credit balances are the provision made for income-tax payments and a matter of some £1500 which we hold for our friends the Union des Gaz. The usual position of our current account with them is reversed; normally they owe us some small sum which figures on the other side among the sundry debtors. We now come to the credit side of our balance-sheet. You will notice an increase of some £22,000 in the total of our investments. This increase is attributable to the investment of the sums passed to exchange reserve account, to which I have already alluded. The decrease in the proportion of gas securities has also been accounted for. As to the actual value—apart from the book value—of these investments, you will realize the impossibility of making any reliable valuation of our French holdings in the present position of the exchange market. The market value of our other investments, I am happy to say, shows a substantial surplus over the value for which they figure in our books. This is the fruit of the cautious policy followed by the Board in 1921, when all our investments—except, of course, the Union des Gaz—were written-down to their current value. Cash at bankers, loans, &c., show an increase of some £3000. Sundry debtors nearly disappear, as our friends the Union des Gaz, who usually owe us something, figure this year among our creditors.

THE UNION DES GAZ.

I now have something to say, which will, I hope, not be without interest to you, on the subject of the Union des Gaz. Last year I reported to you the excellent progress made by that Company since it had succeeded in disentangling itself from the mass of difficulties which arose from the war. That progress has continued, and is reflected in the dividends paid—for 1922-3, 5 p.ct.; for 1923-4, 7 p.ct.; and for 1924-5, 7½ p.ct. As I mentioned above, the Union des Gaz is changing over from a July-June year to a January-December year by means of two periods of nine months each, and the last-named distribution represents the earnings of nine months only. This is not the only re-organization carried out by our French friends. It has long been felt that some steps should be taken to bring the value of the nominal capital more into line with the present-day value of the franc. It must be remembered that the subscribed capital of the Company consists of gold francs. The dividends now being distributed are in paper francs, so that really a dividend of 6 p.ct. paid in paper francs is little more than one of 1½ p.ct. in gold francs. After due consideration, the French Company decided to effect an operation which corresponds, roughly speaking, to the issue in this country of bonus shares. The procedure in France is, however, not so simple. Their method, which appears to us rather laborious, is as follows: They pay off all the capital on the existing shares, which thereby become what are known as "*Actions de Jouissance*"—that is to say, shares that enjoy dividend rights but have no claim, or only a very distant claim, to any further consideration in the case of the liquidation of a company. Simultaneously with this refund, or shortly after, a new issue of shares is made, to which existing holders have the right to subscribe, share for share. What normally happens is that the shareholder applies the refund on his old shares towards the subscription to the new issue, so that he becomes the proprietor of one new fully-paid share and one "*Action de Jouissance*" in exchange for his one old fully-paid share, without making, or receiving, any cash payment. This is, broadly speaking, the procedure which has been followed by the Union des Gaz. The operation was not fully completed on June 30; but the resulting situation is that we now hold one "*Action de Jouissance*" and one new share, where formerly we only held one share. The new shares, representing capital actually in the hands of the Company, are entitled to a first dividend of 6 p.ct.; all profits distributed above that figure are spread equally over the whole of the nominal capital, fully-paid shares and "*Actions de Jouissance*" alike. The exchange has cost us nothing, so that the book value of our holding remains unaltered. A certain number of the old shareholders of the Union des Gaz preferred to keep the cash refunded on their old shares, instead of applying for the new issue. As by French law a company cannot proceed to the allotment of new capital unless the whole of the issue is subscribed, we were invited to subscribe for a portion of the balance not taken up, so as to ensure the success of the issue. Your Directors considered this an excellent opportunity of making a profitable investment of 2½ million francs which we have held in French Treasury Bonds since 1921. It is rather pathetic to remember to-day that these francs, paid to us in 1921, chiefly for the redemption of preference rights—and therefore on capital account—on our Union des Gaz shares were left in France on account of the extremely high rate of exchange, which was then 46·70 frs. to the pound. We have been waiting ever since for the rate to improve; but as it now appears highly improbable that the franc will ever see anything like that

figure again, your Directors consider it an excellent move to realize the French Government securities, of which the value is governed entirely by the value of the franc, and apply the proceeds to a further investment in the Union des Gaz, an industrial concern which is capable of appreciation irrespective of the franc value.

THE FRANC'S DEPRECIATION.

I should like to show you what a remarkably apt illustration we have, in our Union des Gaz shares, of my contention that industrial holdings of ordinary shares in francs are preferable to French Government securities which move with the franc value only. In June, 1922, when the franc was at 52·80, the market value of our holding of Union des Gaz shares was estimated to be about £244,000; in June, 1923, with the franc at 75·60, the market value was £290,000; in June, 1924, with the franc at 81·70, the market value was £312,000; and at June 30 last, with the franc at 107·60, our holding in the Union des Gaz was worth, at current prices, £409,000. During this period of four years, to which I have just referred, while the franc depreciated from 52·80 to 107·60 to the pound, our French investments appreciated from £244,000 to £409,000. ["Hear, hear."] Had this investment been a Government security, its market value would have kept pace with the franc, and would now be somewhere in the neighbourhood of £100,000. Unfortunately, we have considerably further to go before we see the market value of our French holdings begin to approach their book value. In fact it is so doubtful if it ever will—by normal courses—that we may at once face the prospect of being compelled at some date in the more or less distant future to write-down a large portion of their book value. I may here remind you of what I said in my speech to you in December, 1921. I then said:

> "There may, of course, be little or no hope of the French exchange righting itself again (though that is not my opinion); but if that should unfortunately be the case, we should be bound then to deal with the shares we hold in foreign gas companies, either by writing-down or by reducing our capital. In my opinion, the consideration of such measures as these is premature, and we should be well-advised to possess our souls in patience until we are out of the present uncertain state of affairs."

We meanwhile await the steps that the French Government may take towards stabilizing the franc. When once the French franc is stabilized—that is, linked to a gold value—we shall be able to take stock and put our house in order. In the meantime we should pursue our policy of gradually accumulating an exchange reserve fund with this end in view.

LIQUIDATION IMPOSSIBLE.

I hope that these remarks will be taken to heart particularly by those few stockholders who have in recent years urged the advisability of liquidation. Such a step is—at present, in any case—manifestly impossible. Furthermore, though I have given you figures for the market value of our Union des Gaz shares at various dates, there is no saying to what their price would descend if we attempted to put our large holding on the market. It will be observed that, while the value on our books of the Union des Gaz shares remains stationary, the grand total of our investment continues to increase. I explained this increase when we were considering the figures of our balance-sheet; but a point I wish to make now is that as our general investments—apart from the Union des Gaz—increase, so our dependence upon the franc naturally decreases. It is not my intention to deal with any prognostics as to the future value of the franc, for my former references will have considerably lowered my value as a prophet; but I wish once again to call your attention to the fact that I have never prophesied for the near future, but have always taken a long and somewhat distant view of the situation. The opinion expressed both by me, and by those who are more competent to judge, I still maintain. There is no doubt that France has a long and painful road to travel towards financial rehabilitation; but I still believe that she will succeed in her efforts, and that the period of financial soundness and stability is not as far distant as some people may imagine.

TURN OF THE TIDE.

I cannot close my remarks without thanking the stockholders of this Company for their patience in waiting for the turn of the tide, and for the support to the Board which they have so generously given. During the time when we were unable to pay dividends even on our preference stock the Board have been subject to very little adverse criticism; but we have received advice, sometimes couched in somewhat acrimonious terms, and sometimes more in sorrow than anger. The gist of this advice has always been to ask the Board to liquidate our holdings and to wind-up the Company. Had we followed that advice, we should have sacrificed the whole of the not inconsiderable accretion in value on the shares of the Union des Gaz held by our Company; but by far the strongest reason against adopting any such proposal was, and still is, the impossibility of putting it into practice, except at a disastrous loss. There is, however, one class of critics whom I should like boldly to confront now, and whose jeremiads give me great pleasure to hear. We were informed that one of our stockholders had invested in our stock believing the Company to be a sound non-dividend-paying concern—just such a class of investment as he was seeking, to avoid falling into the clutches of the Special Commissioners for Income-Tax—but that now by paying a dividend we had sadly disappointed him. [Laughter.] I can only sincerely trust that we may go on disappointing such stockholders, and that their displeasure may increase in direct ratio with the augmentation of our dividend.

Sir Henry Birchenough, Bart., K.C.M.G., formally seconded the motion for the adoption of the report and accounts.

Mr. S. Pearson asked whether the Chairman could assist him in the elucidation of the fact that the preference stock of the Company showed about 8 p.ct. yield, while the ordinary stock gave only a little over 5 p.ct. Was this not an indication that things were going to be very much better in the future than they were at the present moment—in the eyes of the Stock Exchange at all events?

Mr. S. Herbert said he came to the meeting in a very inquiring frame of mind; but the Chairman had explained matters so fully that he had not so many queries to put now. There were, however, still one or two things he would like to ask. In the first place, he would be glad to have a list of the investments, because the accounts were rather meagre. The stock now stood at 62 p.ct. discount, and the total value of the £1,000,000 which had been put into the concern was therefore £380,000. Would the Chairman tell them whether the investments were worth more than this? He understood from what had been said that they were worth £600,000 or £700,000, and if this was the case the stock should really stand at 30 p.ct. discount. If the Chairman could enlighten them on this point, it would put a little heart into the proprietors. What was intended to be done with the exchange reserve? He would like to point out that the preference stock was contingent on the profits of each year; and building up a reserve like this would really be making it a guaranteed stock. Were the Directors going to put it to capital?

The Chairman: Perhaps; we cannot tell. Continuing, he said the real value of their stock was a very difficult thing to state. His own opinion was that the stock was certainly worth more than 38 as the break-up value; but, of course, when things were "broken-up" they did not always turn out as expected. Several stockholders were taking objection to the reserve fund. The preference stock had no right to anything more than 7 p.ct. non-cumulative, so that any reversion would naturally be to the ordinary stockholders. A very great deal must depend on the future of the franc; but he could not help thinking that when France had settled her foreign debts, and when she had stabilized her currency, a very different state of things would prevail over there. Any increased prosperity of that kind would have an enormous effect upon their Company; but at the present moment everything was in a state of flux. That being so, they must keep an eye on the other side of the question, and bear in mind that things might go badly for them. This was why the Board thought it prudent to build-up such a reserve fund as they could afford, and to put it under the shelter of good old-fashioned securities.

Mr. Henry Jacob inquired the price of Union des Gaz stock.

The Chairman replied that the new issue had not been quoted; but the *"Actions de Jouissance,"* which were what one got for nothing, were quoted at 400 frs. for the 500 frs. share—that was paper. The new shares, which represented the real capital, had a right to 6 p.ct., and then the surplus was divided between the two classes of shares.

The resolution was then carried unanimously.

RE-ELECTIONS.

The Right Hon. Lord Wargrave, P.C., remarked that in the unfortunate absence through ill-health of Sir George Touche, Bart. (the Deputy-Chairman), the duty devolved upon him of moving the re-election of the two retiring Directors—the Chairman and Sir Henry Birchenough. Those of them who, like himself, were very old shareholders in this concern, would recall the very deep obligations they were under to the Chairman. He remembered the time of the Italian crisis, when the Company were embarked on very difficult seas, and near foundering. It was mainly owing to the very marked ability of Col. LeRoy-Lewis that the undertaking was pulled back into port. That was just on the eve of the Great War, the difficulties of which were still in the minds of all; and once more they were indebted to the Chairman for the able manner in which he had pulled the concern round. He agreed that the future was promising; but how soon the promise would be fulfilled no one could tell. They all rejoiced to have the Chairman in the position he occupied, and might he long live to guide the destinies of this Company. Sir Henry Birchenough, as they all knew, stood high in the City, and his advice was of the utmost value to the Company.

Sir James F. Remnant, Bart., M.P., seconded the resolution, which was agreed to.

The Chairman, in the course of his acknowledgment, said Sir George Touche had been extremely ill for six months; but happily he was making a steady, though slow, recovery towards good health again, and they hoped within a reasonable time to see him in the City once more.

The Auditors (Messrs. C. P. Crookenden, F.C.A., and G. A. Cave-Orme, J.P.) were re-appointed, on the motion of Mr. W. M. Meyrick-Jones, seconded by Mr. R. J. Remnant.

VOTES OF THANKS.

The Chairman, proposing that the thanks of the meeting be accorded to the staff for their services during the past year, said that the staff at Drapers' Gardens was not a large one, but it was very efficient; and if stockholders wished to learn any more details of the position or operations of the Company, and would call at the offices, either he himself or the staff would be ready to give all possible explanations.

Sir Henry Birchenough seconded the vote, which was heartily passed, and acknowledged by Mr. Nops.

The meeting concluded with a vote of thanks to the Chairman and Directors, which was accorded on the proposition of Captain W. J. Liberty.

New Carbonizing Plant for Malvern.—An inquiry was held by Mr. H. R. Hooper, of the Ministry of Health, on Friday last, into an application by the Malvern Urban District Council for sanction to obtain a loan of £17,500, to enable them to instal a new carbonizing plant at the gas-works. Mr. E. D. Wootton (Gas Engineer) stated that it was proposed to instal twelve vertical retorts of a capacity of 940,000 c.ft., in the place of three beds of inclined retorts, thus leaving seven beds of inclines. The total capacity under the scheme proposed would be 1,840,000 c.ft., against the present 757,000 c.ft.

GAS REGULATION ACT APPLICATIONS.

The following notice has appeared in the "London Gazette" regarding an application to the Board of Trade under the Act.

SPECIAL ORDERS.

Bedford District Gas Company.

To acquire scheduled lands, and to incorporate in the Order various provisions relating to the supply of gas, &c.

Borough of Mossley.

To acquire scheduled land, to enable the Corporation to borrow additional money, and to incorporate in the Order various provisions relating to the supply of gas, &c.

DECLARATION OF CALORIFIC VALUE.

East Kent Gas Company, Ltd.—400 B.Th.U. (Oct. 1.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration a copy of the following Order made by the Board of Trade under section 1.

Padiham Urban District Council.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 16·4d. per therm; and this price shall be substituted for the price mentioned in section 33 (limiting the price for gas) of the Padiham Local Board Act, 1876.

After the declared date "3d. per therm" shall be substituted for "1s. 3d. per 1000 c.ft.," and "1·2d. per therm" shall be substituted for "6d. per 1000 c.ft." in section 11 (charges for gas supplied in extended area) of the Padiham Urban District Council Act, 1908. The words "3d. per therm" shall be substituted for "1s. 3d. per 1000 c.ft." in para. (2) of Article I. of the Padiham Order, 1911.

Prepayment meter clauses are included. (Sept. 28.)

CHAPEL WHALEY AND DISTRICT GAS COMPANY.

Board of Trade Inquiry.

On Oct. 1 and 2, Mr. J. F. Ronca, Director of Gas Administration at the Board of Trade, heard the Chapel Whaley and District Gas Company's application for an Order which, among other things, would permit them to erect a new works at Whaley Bridge.

Under a Special Act of Parliament the Company was formed in 1911 with a capital of £20,000. It took over existing works at Whaley Bridge (Cheshire) and Chapel-en-le-Frith (Derbyshire), and considerably extended the area of supply in both counties. The consumption in the first year was 13 million c.ft., which had increased last year to 66 millions. Meantime a gasholder had been built at Bugsworth, midway between the works, which are four miles apart. Both existing works are old-fashioned, and at neither is there room for extension to meet the increased demand for gas in a rapidly-growing district, which includes several suburbs of Manchester; and the Company decided to construct a modern works and concentrate the business, making provision also for the production of electric current eventually, if deemed wise. A site was purchased at Whaley Bridge, near the railway sidings, and the scheme is estimated to cost £45,000.

The scheme was explained to the Director by Mr. J. H. Clarke, the Company's Engineer and Manager, and had the support of Mr. Doig Gibb. Mr. Gibb's view was that, even if there was no increase in the consumption of gas, the economies effected in manufacturing and distribution would pay the interest on the additional capital employed. He had inspected the whole area of supply, and had come to the conclusion that the site was the only possible one for a new works.

There was no opposition to the Company's concentrating and expanding its business; but powerful opposition was offered to the site chosen. It was round this point that the whole of the two days' inquiry revolved.

The site is in Derbyshire, but near enough to Cheshire to bring portions of that county within the 300 yards radius. The Chapel-en-le-Frith Rural District Council, the major local authority, within whose area the site is situated, had filed a formal petition against the site, but subsequently withdrew it, and passed resolutions that were in favour of it virtually. The Fernilee Parish Council, the minor local authority, opposed the site. On the Cheshire side of the river, the Macclesfield Rural Council had not filed a petition, but the Taxal Parish Council, the minor local authority, had. It transpired during the inquiry that the Clerk to the Macclesfield Rural Council had written to the Manchester District Advisory Town Planning Committee, who operate in the district, to act for them in opposing the site, as the Parish Council were against it. These opponents were joined by two church councils, managers of two day schools, the War Memorial Park Committee, the Bleachers' Association, who have two works in the locality, the local Co-operative Society, and property owners and residents.

The case of these opponents was that there were 224 houses, with a population of 900, within a radius of 300 yards; that a day school was within 20 yards, and prevailing winds would carry any fumes there might be into it; that further building was in progress, and some of the land near by had been recommended by the Taxal Parish Council to the Macclesfield Rural Council as a housing site. Goyt Valley, a famous Derbyshire beauty spot, lies between Whaley Bridge and Buxton; and it was contended by the opponents that the works would be at the very gateway of the valley, though there is a bleach-works beyond it. This was characterized by Counsel for the Company as a misrepresentation made to create prejudice.

The Fernilee Parish Council offered to give the Company what they had paid for the land, so that it could be converted into a recreation ground, and stated that half the cost was guaranteed.

The opposition had the support of Mr. G. F. Shaw, Gas Engineer to the Buxton Corporation. Two alternative sites were suggested. One of these, Cadster, was favoured by Mr. Shaw, though he admitted that a railway siding would cost £2000, and that there was not a trunk main near. He also said that the site chosen, nearly three acres, was too small having regard to the Company's prospects, which were second to none, and the possibility of electric current being produced. He did not consider it essential that a gas-works should have a railway siding, and mentioned a number that were without them.

Mr. Gibb's opinion was that a railway siding on the Cadster site would cost £2500, and that the land was water-logged, and difficult to build upon. In his opinion, a works on that site would ruin the Company, and make cheap gas for the district impossible. The site chosen was adequate, and capable of producing 1¼ millions per day.

A singular part was played at the inquiry by the Manchester and District Town Planning Advisory Committee. Officials asked to be heard in support of the objections filed by the two Parish Councils, though the Committee had not filed an objection, and the officials admitted they were there on the instructions of the Chairman, and not of the Committee, which had not considered the question as a Committee.

Objections were raised by Counsel for the Company; but the officials were heard.

The Assistant Secretary to the Town Planning Committee stated that zoning proposals were made by a Sub-Committee over which the representative of the Chapel-en-le-Frith Rural Council presided. The area of the two bleachworks was scheduled as industrial, and the site of the proposed gas-works as an open space. Later, the Chapel-en-le-Frith Council made zoning proposals of their own, and the industrial area was extended so as just to include the site of the gas-works. The Council must have had some reason for doing so. He would say nothing except that the Chairman of the Council's Town Planning Committee was a Director of the Gas Company.

The Chief Surveyor to the Manchester Town Planning Committee said it would violate the practice of town planning to erect a gas-works on this site. It was in the centre of the village, and would nullify its natural growth. There would have to be a widening and straightening of a road and bridge, and this could only be done by taking in a portion of the proposed site. A school should never be located near a gas-works. He expressed the view that the erection of a gas-works would seriously depreciate the surrounding property.

Counsel for the Company stated that the works would never be seen by 90 p.ct. of the objectors, and that the Company, who desired the goodwill of the people, were not regardless of the amenities of the neighbourhood. Had they believed the works would be a nuisance, the site would never have been proposed.

HALESOWEN GAS-WORKS EXTENSION.

To commemorate the extension of the works recently completed, the Directors of the Halesowen Gas Company gave a dinner to the employees on Tuesday of last week, at the Steel Works Canteen. The Chairman of the Directors (Mr. G. F. Grove) presided, and those present included Messrs. A. Homfray, F. Somers, O.B.E., C. Dakin (Directors), J. W. Scott (of Messrs. R. & J. Dempster, Manchester), J. Chapman (Chairman of the Urban Council), F. Holyoake (Secretary), and J. N. M'Coll (Manager).

Mr. Homfray proposed "Success to the firm of Messrs. Dempster, of Manchester." He remarked that the firm were known all over the world as great gas engineers. Their work was always well done. The firm built the holder the Company erected twenty years ago; and it was then thought to be a big thing. Now the Company had put down a much larger one; and Messrs. Dempster had erected it to their entire satisfaction. Mr. Scott said the gasholder just installed was testimony to the progress the district was making. Halesowen was to be congratulated upon having a Company who could supply gas from 2s. 9d. per 1000 c.ft. upwards.

TRADE NOTES.

Steel Barrows.

The Constructional Engineering Company, Ltd., of Titan Works, Birmingham, have published a pamphlet dealing with their "Titan" steel barrows, the excellent qualities of which make them particularly useful in gas-works for removing coke, ashes, &c.

Tar Dehydration Plant for New Zealand.

The Woodall-Duckham Vertical Retort & Oven Construction Company (1920), Ltd., have received an order from Messrs. John Terry & Co., No. 7, Great Winchester Street, E.C. 2, for a "T.I.C." tar dehydration plant to be erected in New Zealand, to produce Road Board tar at the rate of 20 tons per 24 hours.

United Water Softeners, Ltd.

The expansion of the Company's business having rendered the existing offices at Imperial House, Kingsway, inadequate for the accommodation of their increased technical and commercial staffs, the Board have transferred the entire headquarters organization to new offices at Aldwych House, W.C. 2. The Company's works, laboratories, and test houses will remain at Brentford, as heretofore.

South Australian Gas Company.—In their annual report for the year ended June 30, the Directors record a profit of £67,308 after providing £25,578 for transfer to the special purposes fund. After making provision for a dividend of 8 p.ct., it was not possible to transfer to this fund the full 2½ p.ct. on the total of paid-up capital and moneys owing on bonds; the amount being £9749 short.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The recent improvement in the market has been fully maintained during the past week, and the steadier tone has become more widespread. In some instances quotations have stiffened slightly; but this is mainly due to collieries having fuller turns for the next few weeks, and there is little evidence as yet that buyers are prepared to pay higher prices. The satisfactory feature is that there is undoubtedly a greater volume of trade, induced by the more reasonable prices which have been ruling since the settlement. It is to be hoped that the better inquiry will not be frightened off by a general raising of quotations.

Gas makes have been in quite good demand, and 16s. 6d. to 17s. f.o.b. is the quotation for Wear Specials, and about 16s. 9d. for best qualities. Seconds are still about 13s. 6d. to 14s., but steadier at this level. Durham unscreened coking has been in better demand at 13s. 3d. to 13s. 9d., and best bunkers quote stronger at 14s. 6d. to 15s.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

There is no general movement among the collieries for the institution of higher winter prices. In a few cases managements have notified advances of 1s. to 2s., and for special qualities which are in limited supply prices are raised this month by as much as 3s. and 4s. But taking the trade all round, the readjustments which have been effected are mainly of a minor character such as the withdrawal of special concessions previously made on the regular lists. Demand is slightly better. Any improvement of the market tone that can be discerned is attributable to anticipations of increasing demand now that solar time applies once more, for autumn temperatures have to be reckoned with. Inquiry is more active as regards both coal and coke for central heating and other domestic uses. Works qualities do not move off at all freely. Supplies are so plentiful that the requirements of the market can be satisfied with the minimum of delay, and there is little chance of the generation of stronger conditions.

The cokeries have been unable to agree upon a new basis of coke prices with the associated pig-iron producers of the Midlands. There has been a continuous deterioration of pig-iron values, and no one can say that the downward movement has reached its limit. Blast-furnacemen pressed, therefore, for the fixing of a lower basis than the 12s. 6d. at ovens that has lately prevailed. The ovenmen hold that closing down is preferable to any addition to the loss which present prices involve; and the placing of contracts has been left open.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

A rather better tone prevails among Yorkshire and Lancashire collieries, the majority of which are working for longer periods. House coal has moved more freely of late, owing to the prospect of colder weather; and although the industrial situation has not materially altered, there is an indication that the stocks recently accumulated are now being rapidly depleted, with the result that there are more inquiries than for some time past. Whether the flow of business is increasing is rather doubtful.

Gas coal will move more freely during the next few weeks as a result of shortening days and the reversion to normal time. Prices in the meantime for outside parcels or for forward business appear to be lower than were anticipated, and it is unlikely that collieries will obtain the figures they expected some time ago.

The export section reports progress with increased business for the principal kinds shipped at home—namely, Yorkshire hards, washed doubles, washed singles, and washed smalls. These qualities have advanced in value from 1s. to 2s. per ton.

Prices at Hull (f.o.b. usual shipping ports) at the week-end were: South Yorkshire.—Hards, Association, 19s. 3d. to 19s. 6d.; screened gas coal, 17s. 6d.; washed trebles, 18s. 9d.; washed doubles, 18s. 3d. to 19s.; washed singles, 17s. to 18s.; washed smalls, 14s. 6d.; rough slack, 10s. to 10s. 6d.; smithy peas, 18s. to 19s. 7d. West Yorkshire.—Hartleys, 16s. 6d. to 17s.; screened gas coal, 16s. 6d. to 17s.; washed trebles, 17s.; washed doubles, 17s.; washed singles, 16s.; washed smalls, 12s.; unwashed trebles, 16s.; unwashed doubles, 12s. 6d. to 13s. 6d.; rough slack, 10s. to 10s. 6d.; coking smalls, 10s. Derbyshire and Nottinghamshire.—Top hards, 19s. 6d. to 21s.; washed trebles, 18s.; washed doubles, 17s.; washed singles, 16s. 6d.; washed smalls, 13s.; rough slack, 9s. 6d. to 10s. Yorkshire, Derbyshire, and Nottinghamshire.—Screened steam coal, 16s. to 17s. 6d.; gas coke, 18s. to 23s.; furnace coke, 18s. to 19s. 6d. per ton.

Street Lighting at Whitley.—There is disagreement between the Dewsbury Corporation Gas Committee, as suppliers, and the Whitley Upper Urban District Council, as purchasers, on the subject of the charge for gas for street lighting at Whitley. The Dewsbury Committee charge £3 5s. a lamp per annum, and the Whitley Council decline to pay that figure. The Gas Committee have therefore given notice of the termination of the agreement between the two bodies unless the sum is forthcoming.

East Kilbride Gas.—The East Kilbride Gas Light Company's undertaking has been purchased by the Lanark County Council for £5750. Following the transference of the undertaking to the Middle Ward District Committee, it has been decided that, instead of continuing to manufacture gas in East Kilbride, a bulk supply will be taken from Cambuslang. The price has been provisionally fixed at 1s. 3d. per 1000 c.ft. Arrangements have been made for the construction of a high-pressure main from Flemington to East Kilbride, a distance of 7000 yards. The work is to be treated as a relief scheme for unemployed.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *Oct.* 5.

There is a somewhat firmer tone about the market for pitch, and a moderate amount of business is passing. The price is steady to-day at 41s. to 42s. per ton f.o.b. works.

Creosote also is displaying a firmer tendency, and the price is steady at 6¾d. to 6⅞d. per gallon.

Phenol is quiet, and the price is unchanged at about 4¼d. per lb.

Tar spirits continue firm at the prices last recorded.

Tar Products in the Provinces.

Oct. 5.

There is little alteration in the markets for tar products.

Pitch continues firm and without any great alteration in value.

Creosote oil is still steady, and the demands of the Railway Companies have improved the tone generally.

Water-white products are quiet, with rather less business passing.

Other products remain neglected.

The average values for gas-works products during last week were: Gas-works coal-tar, 27s. 9d. to 32s. 9d. Pitch, East Coast, 40s. to 41s. f.o.b. West Coast—Manchester, 34s. 6d. to 35s. 6d.; Liverpool, 35s. 6d. to 36s. 6d. Clyde, 37s. to 39s. Benzole, 90 p.ct., North, 1s. 7½d. to 1s. 8¼d.; crude, 65 p.ct., at 120° C., 1s. to 1s. 1d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 7½d. to 1s. 8¼d. Toluole, naked, North, 1s. 6¼d. to 1s. 7½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8¼d. Solvent naphtha, naked, North, 1s. 4¼d. to 1s. 6d. Heavy naphtha, North, 1s. to 1s. 2d. Creosote, in bulk, North, liquid, 5⅞d. to 6d.; salty, 5⅞d. to 6d.; Scotland, 5⅝d. to 5⅞d. Heavy oils, in bulk, North, 6¼d. to 6⅜d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2¼d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Manchester District Tar Prices.

The average price realized for the sale of tar in the Manchester district, according to the sliding-scale, for the month of July was £2 7s. 7·34d.

Gas-Workers and Non-Unionism.

A meeting of the Manchester Regional Joint Industrial Gas Council was held in the Town Hall, Manchester, on Sept. 29, to consider a serious situation which has arisen on the question of the employment of non-union labour in gas undertakings in the Manchester area. According to Mr. J. Williams, Organizer of the Gas-Workers' Section of the National Union of General and Municipal Employees, between 9000 and 10,000 trade union men in the area have threatened to strike unless their non-union fellow-workers become members of a trade union. The meeting of the Regional Council decided to recommend the various gas undertakings to publish notices approving of closer organization between employers and workers. The notices will contain extracts from the Whitley report of March, 1917. One of the extracts expresses the view that "an essential condition of securing a permanent improvement in the relations between employers and employed is that there should be adequate organization on the part of both employers and workpeople." It was stated that the Joint Secretaries of the Council, Mr. J. H. Sillitoe (for the employers) and Mr. J. Williams (for the workpeople), would send a letter to the undertakings, asking that the notices should be published.

Matlock Gas Prices.—The Directors of the Matlock and District Gas Company have decided to increase the price of gas by 3d. per 1000 c.ft., the change to take effect immediately.

Price Reduced at Fleetwood.—The Fleetwood Gas Company have reduced the price of gas 2d. per 1000 c.ft. The Company are now putting-down new purifiers and other apparatus; the work being in the hands of Messrs. R. & J. Dempster, of Manchester.

Killamarsh Lighting Deadlock.—The Killamarsh Parish Council have received a letter from the local Gas Company stating that they cannot make any further reduction in the price of gas for street lighting. The Council have therefore decided to approach the Staveley Company with a view to introducing electricity. At a parish meeting it has been agreed to spend £250 on street lighting during the winter, which is equal to a rate of 4½d. in the pound.

Gas Poisoning Deaths at Preston.—An inquest was held at Preston on Monday concerning the deaths of two septuagenarians, George Bell and Ellen Bell, of Goodier Street, who were found gassed in bed. Annie Catterall, a daughter, said she noticed a strong smell of gas in the house. One of the taps had a flexible tube passing through the ceiling to a stove upstairs, and the tap seemed very loose. Police Constable Wilde said the man's position indicated he had tried to get up, but had fallen back. Returning a verdict of "Accidental death through gas poisoning," the Coroner said there was no suggestion of suicide.

Gas Exhibition at Altrincham.—Mr. Thomas Fairhurst (Chairman of the Altrincham Gas Company) performed the opening ceremony at a gas exhibition in Altrincham yesterday. This exhibition, which is to continue until Friday next, is being held in the British Schools, Oxford Road, where a large number of interested visitors are attending. Practical cookery demonstrations are being given each afternoon and evening. The display of apparatus, which is skilfully set out, covers every purpose for which gas is used in the home. Conspicuous among the equipment are Fletcher Russell's "Kingsway" cookers and "Historic" gas fires, also Richmond's well-known "Bungalow" cookers and "Standard" gas fires. Many appliances are shown fitted and in operation; and the exhibition will undoubtedly give a great stimulus to the special cash and hire purchase schemes in vogue in this progressive town.

STOCK MARKET REPORT.

ALTHOUGH there were substantial reasons for the change in the Bank Rate, the reduction last week was quite unexpected. It came as an agreeable surprise to investors; one result being a gift of nearly one-half per cent. to the lucky tenderers for the £40,000,000 Conversion Loan issue. The Stock Markets quickly responded to the lower official value of money. All investment stocks were marked-up, and a stimulus was given to securities of a more speculative character.

The decisive defeat of the "Reds" at the Labour Conference at Liverpool also brought about an improvement in the Home Rail and Industrial Markets. Of the former the Metropolitan and District ordinary stocks were most prominent. Rubbers again dominated the situation in the Industrial Market, and the tendency to sell any other security in order to participate in the Rubber activity continued. More interest than of late was also shown in the Textile and Tobacco Markets. Gas Stocks continue to be depressed, the exception being a rise of 7 points in the Brighton and Hove "A" ordinary stock. The report of the British Gas Light Company was interesting reading, and, although the balance of profit available was £4777 less than the previous year, the final dividend of 4 p.ct., less tax, making 7½ p.ct. for the year on the ordinary stock, was maintained.

The following transactions were recorded during the week:

On Monday, Aldershot "C" 75¾, 76¾, Bournemouth 3 p.ct. debenture 57½, 59, Commercial 4 p.ct. 78, European 7¼, Gas Light and Coke 79½, 79⅝, 79¾, 80, 80¼, 4 p.ct. preference 78½, 3 p.ct. debenture 60, Hongkong and China 18, 18¼ *ex* div., Imperial Continental 149½, 150, 150½, Montevideo 68½, Primitiva 12s., 12s. 1½d., 12s. 3d., 12s. 4½d., 12s. 5¼d., 12s. 6d., 12s. 7½d., South Metropolitan 90¾, 91, 6½ p.ct. debenture 102½, 103, Wandsworth (Epsom 5 p.ct.) 115¼.

On Tuesday, Bournemouth 6 p.ct. preference 11⅛, 11⅜, British 109¼, 109⅜, Commercial 4 p.ct. 78, European 7¼, Gas Light and Coke 79½, 79⅝, 80, 80¼, Hastings and St. Leonards 3½ p.ct. converted 74½, Imperial Continental 149, Primitiva 12s. 1½d., 12s. 3d., 12s. 4½d., 12s. 6d., 12s. 6⅝d., 12s. 7½d., 4 p.ct. (Buenos Ayres) debenture 64, 64½, South Metropolitan 90½, 90¾, 91½, Southampton 81, 4 p.ct. debenture 73. Supplementary prices, South Suburban 7 p.ct. debenture 103½.

On Wednesday, Aldershot 4 p.ct. preference 70, Bournemouth 3 p.ct. debenture 58½, 59, Brentford 4 p.ct. debenture 78, 6 p.ct. Richmond debenture 102, Brighton and Hove "A" 125, 126, Continental Union 37½, European 7¼, 7⅜, Gas Light and Coke 79¼, 4 p.ct. preference 78½, Imperial Continental 149½, Liverpool 7 p.ct. preference 102, 102¼ *ex* div., Primitiva 12s. 3d., 12s. 4½d., 12s. 6d., 12s. 6⅝d., 12s. 7½d., South Metropolitan 91, Southampton 5 p.ct. maximum 81⅞, 4 p.ct. debenture 74, Wandsworth "C" 90. Supplementary prices, Bournemouth 7 p.ct. debenture 103, 103½, British (Hull 4 p.ct. mt. debentures) 73¼.

On Thursday, Aldershot 4 p.ct. preference 70½, Bombay 19s. 6d., Brentford 4 p.ct. debenture 80, Commercial 4 p.ct. 78, 80, Continental Union 7 p.ct. preference 90, Gas Light and Coke 79½, 79⅝, 80, 4 p.ct. preference 77½, 78½, 3 p.ct. debenture 60, 60⅛, Imperial Continental 149, Primitiva 12s. 3d., 12s. 4½d., 12s. 6d., 12s. 6⅝d., 12s. 7½d., 12s. 9d., South Metropolitan 91, 91⅜, 91½, 3 p.ct. debenture 59, South Suburban 95, 96.

On Friday, British 109½, Commercial 3 p.ct. debenture 58, Continental Union 7 p.ct. preference 90½, European 7 7/16, Gas Light and Coke 79½, 80, 3 p.ct. debenture 59⅜, Hastings and St. Leonards 5 p.ct. converted 95, Imperial Continental 149, 149½, 150½, Montevideo 70, Primitiva 12s. 6d., 12s. 6⅝d., 12s. 7¼d., 12s. 9d., 12s. 10½d., San Paulo 6 p.ct. preference 8 *ex* div., South Metropolitan 91½, Southampton 81⅜, 81⅞. Supplementary prices, Hartlepool 5 p.ct. maximum 87.

In the Money Market supplies of credit were still abundant, having been materially augmented by the heavy dividend disbursements, and fresh money was offered freely from 2½ p.ct. down to 2 p.ct. Discount rates were easier in tendency in spite of the fresh decline in the dollar-sterling. The average rate at which Treasury Bills were allotted—£3 7s. 3·39d. p.ct., 3s. 1d. below the previous week's rate—was much in accordance with expectations.

There was more activity in the Foreign Exchange Market at the end of the week, particularly in the French and American exchanges. The Paris cheque rose to 104.65, finally closing at 103.90. Belgian francs lost much of the mid-week improvement, and closed at 108.15. Sterling on New York, however, was weak; but a steadier tone ultimately prevailed, and the rate was finally quoted at 4.84.

Silver was idle, due partly to China being out of the market, and the price declined to 32⅞d. per oz. Gold remained unaltered at 84s. 11½d. per oz.

The Bank Rate is 4 p.ct., to which it was reduced from 4½ p.ct. on Oct. 1. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Oct. 2.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			°/o p.a.	°/o p.a.				
171,978	Stk.	Aug. 13	5	5	Aldershot 5 p.c. max. C.	75—78	..	73½—76½
295,492	,,	,,	4	4	Do. 4 p.c. Pref.	69—74	..	70—71
1,551,868	,,	Apl. 2	6¼	6¼	Alliance & Dublin Ord.	63—68	..	..
374,000	,,	July 9	4	4	Do. 4 p.c. Deb.	60—65	..	..
300,000	1	May 7	1/7½	1/7½	Bombay, Ltd.	½—1	..	19/6
170,000	10	Aug. 13	8½	8½	Bournemouth 5 p.c.	12—13	..	..
425,050	10	,,	7	7	Do. B 7 p.c..	12—12½	..	..
150,000	10	,,	6	6	Do. Pref. 6 p.c..	11—12	..	11⅝—1 ⅛
50,000	Stk.	June 25	3	3	Do. 3 p.c. Deb..	56—59	..	57½—59
162,025	,,	,,	4	4	Do. 4 p.c. Deb..	77—80	..	..
992,045	,,	July 9	6 1/10	6 1/10	Brentford A Con.	93—98	..	..
990,500	,,	,,	6½	6½	Do. B New	93—98	..	..
76,000	,,	,,	5	5	Do. 5 p.c. Pref.	94—97	..	..
306,690	,,	June 11	4	4	Do. 4 p.c. Deb.	76—81	+1	78—80
181,337	,,	,,	6	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	104
214,740	,,	Aug. 27	12½	12	Brighton & Hove Orig.	166—171	..	..
244,200	,,	,,	9½	9	Do. A Ord.	125—130	+7	125—126
1,887,500	,,	July 23	5	5	Bristol 5 p.c. max.	89—91a	..	..
855,000	,,	Mar. 19	8	7	British Ord.	105—110	..	109½—109½
100,000	,,	June 25	7	7	Do. 7 p.c. Pref.	120—125	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	72—76	..	..
100,000	10	May 21	6	8	Cape Town, Ltd.	6½—7½	..	..
100,000	10	Apl. 23	4½	4½	Do. 4½ p.c. Pref.	5½—6½	..	..
150,000	Stk.	June 25	4½	4½	Do. 4½ p.c. Deb.	69—74	..	..
626,860	,,	July 23	6	6	Cardiff Con. Ord.	98—101	..	..
237,860	,,	June 25	7½	7½	Do. 7½ p.c. Red. Deb.	101—104	..	..
157,150	,,	Aug. 13	6½	5	Chester 5 p.c. Ord.	90—95b	..	..
1,513,280	,,	July 23	5/14/8	5/	Commercial 4 p.c. Cap.	78—83	..	78—80
560,000	,,	,,	5⅝	5/3/4	Do. 3½ p.c. Cap.	78—83	..	..
475,000	,,	June 11	3	3	Do. 3 p.c. Deb.	56—59	..	58
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd.	35—40	..	37½
200,000	,,	June 11	7	7	Do. 7 p.c. Pref.	88—91	..	90—90½
660,000	,,	Aug. 13	6½	6½	Croydon sliding scale	96—100	..	..
284,975	,,	,,	5	5	Do. max. div.	81—84	..	..
492,270	,,	Aug. 13	9	6	Derby Con.	107—109c	..	..
55,000	,,	June 25	4	4	Do. Deb.	74—76c	..	..
1,002,180	10	July 23	4	6	European, Ltd.	7—8	..	7½—7⅝
16,460,070	Stk	Aug. 13	5½	5½	Gas Light & Coke 4 p.c. Ord.	79—81	..	79½—80½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	60—63	..	..
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80	..	77½—78½
4,761,930	,,	June 11	3	3	Do. 3 p.c. Con. Deb.	58—61	..	59½—60½
130,000	,,	—	10	10	Do. 10 p.c. Bonds	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Sept. 10	6½	6½	Hastings & St. L. 5 p.c. Conv.	90—95	..	95
258,740	,,	,,	5⅝	5⅝	Do. 3½ p.c. Conv.	71—76	..	74½
70,000	10	Sept. 24	10	10	Hongkong & China, Ltd.	17½—18½*	+½	18—18½
86,600	Stk.	Aug. 13	10	10	Hornsey 7 p.c.	132—137	..	..
1,976,000	,,	May 21	10	59	Imperial Continental Cap.	148—15[illegible]	..	149—150½
226,170	,,	Aug. 13	3½	3½	Do. 3½ p.c. Red. Deb.	70—73	..	..
235,242	,,	Aug. 13	6½	6½	Lea Bridge 5 p.c. Ord.	94—99	..	..
2,127,340	,,	Aug. 13	5⅛	5⅛	Liverpool 5 p.c. Ord.	82—83½b	..	..
600,000	,,	Sept. 24	7	7	Do. 7 p.c. Red. Pref.	101½—103½*b	..	102—102½
165,736	,,	Aug. 27	8	9	Maidstone 5 p.c. Cap.	118—128	..	..
63,480	,,	June 25	3	3	Do. 3 p.c. Deb.	55—60	..	..
75,000	5	June 25	3	7	Malta & Mediterranean	4—4½	..	..
541,920	Stk.	June 11	4	4	Montevideo, Ltd.	65—69	..	68½—70
4,061,315	,,	Aug. 13	5	5	Newcastle & Gateshead Con.	71½—72d	..	..
300,929	,,	,,	4	4	Do. 4 p.c. Pref.	75½—76½d	..	..
529,705	,,	June 25	3½	3½	Do. 3½ p.c. Deb.	68—69d	+½	..
15,000	,,	Aug. 27	12	11½	North Middlesex 10 p.c.	—	..	..
75,940	,,	,,	8⅝	8 9/10	Do. 7 p.c.	—	..	..
500,000	Stk.	May 7	9	7	Oriental, Ltd.	100—105	..	..
188,120	,,	June 25	7⅛	7⅛	Plym'th & Ston'house 5 p.c.	108—113	..	..
60,000	50	Aug. 27	14	14	Portsea Island B	93—96	..	..
100,000	50	,,	13	13	Do. C	90—95	..	..
2,289,909	1	—	—	—	Primitiva Ord.	12/3—13/3	+-/9	12/0—12/10½
302,600	100	June 2	4	4	Do. 4 p.c. Red. Deb.	78—80	..	..
600,000	Stk.	July 23	4	4	Do. 4 p.c. Red. Deb. 1911	64—66	+2	..
193,744	,,	June 25	4	4	Do. B. Aires 4 p.c. Rd. Db.	63—65	..	64—64½
264,496	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	63—65	..	..
150,000	10	Sept. 24	6	6	San Paulo 6 p.c. Pref.	7½—8*	..	8
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	42—45	..	..
270,000	Stk.	Aug. 27	5⅛	5⅛	Sheffield A	101—102s	..	..
419,968	,,	,,	5⅛	5⅛	Do. B	101—102s	..	..
1,047,000	,,	,,	5⅛	5⅛	Do. C	101—102s	..	..
90,000	10	June 11	6	4	South African	7—9	..	..
6,609,895	Stk.	Aug. 13	6½	5	South Met. Ord.	90—92	..	90½—91½
1,895,445	,,	July 9	3	3	Do. 3 p.c. Deb.	57—60	..	59
734,000	,,	Sept. 10	6½	6½	Do. 6½ p.c. Red. Deb.	101—103	..	102½—103
91,500	,,	Aug. 13	8½	8½	South Shields Con.	131—133d	−½	..
1,187,795	,,	July 23	6½	6½	South Suburban Ord. 5 p.c.	92—97	..	95—96
368,837	,,	June 25	5	5	Do. 5 p.c. Deb.	95—98	..	..
647,740	,,	May 7	5	5	South'mpt'n Ord. 5 p.c. max.	80—83	..	81—81½
121,275	,,	June 25	4	4	Do. 4 p.c. Deb.	70—75	..	73—74
250,000	,,	Aug. 27	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
200,000	,,	June 25	6½	6½	Do. 6½ p.c. Red. Deb.	101—103	..	..
120,000	,,	July 23	8	7½	Tottenham District A 5 p.c.	105—110	..	..
882,275	,,	,,	6½	5½	Do. B 3½ p.c.	85—90	..	..
150,000	,,	July 9	—	28/4	Do. 5½ p.c. Pref.	103—105	..	..
181,355	,,	June 11	4	4	Do. 4 p.c. Deb.	76—79	..	..
358,252	,,	Aug. 27	5	5	Tynemouth Con. and New	69—71d	−4	..
197,294	,,	Aug. 27	6½	6½	Uxbridge, Maidenhead, & Wycombe 5 p.c.	93—98	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	93—98	..	..
91,800	,,	,,	6½	6½	Do. 5 p.c. Maidenh'd	88—93	..	..
30,000	,,	July 9	9½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	125—130	..	..
855,636	,,	,,	7½	7	Do. B 3½ p.c.	107—112	..	..
892,955	,,	,,	6/9/6	5/19/0	Do. C and New	90—95	−2	90
332,000	,,	,,	7⅝	6½	Wimbledon 5 p.c.	100—105	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	110—115	+2	115½
88,416	,,	June 25	3	3	3 p.c. Deb.	56—59	..	..

Quotations at:—*a*,—Bristol, *b*,—Liverpool, *c*,—Nottingham, *d*,—Newcastle, *s*,—Sheffield, * Ex. div.

Watford Gas Company.

The annual meeting of the co-partnership members of the Watford Gas and Coke Company was held on Oct. 2. Mr. E. J. Shinn (the Chairman of the Company), in moving the adoption of the balance-sheet and the report of the Co-Partnership Committee, said that the total amount of contributions for the year was £654, and that to this the Directors of the Company had added £1166. Since 1909, when the scheme was first started, the Directors had paid in bonus alone, altogether apart from interest, the sum of £11,275. In 1909 there were 106 co-partners; there were now 202. Bonus and interest were practically three times as much as when the scheme was started, and contributions were almost twice as great. During the same time the output of gas by the Company had increased from 224 million c.ft. to 460 millions. He thought this went to prove that the introduction of co-partnership had made for more zeal in business on the part of the employees, which had brought with it added prosperity.

Lewes Gas Company.—In submitting the report of the Directors at the half-yearly meeting of the Company, Mr. H. M. Blaker, Chairman, drew attention to the increase in the sales of gas, which amounted to 3198 therms. The revenue account, he said, showed a profit for the half-year of £1890. After providing for income-tax, interest on mortgages, &c., the balance of net revenue was £2154. Dividends for the past half-year at the rate of 5 p.ct. on the original capital stock, and £3 10s. upon the additional capital stock, were declared.

Abolition of German Import Licences.—The Board of Trade announce that, from Oct. 1, the requirement of import licences is withdrawn for all commercial goods imported into Germany, except those (a small number) of which a list is published in the "Board of Trade Journal" for the same date.

Aldershot Preference Stock.—Tenders for the £60,000 of 4 p.ct. consolidated preference stock which Messrs. A. & W. Richards offered for the Directors of the Aldershot Gas, Water, and District Lighting Company ranged from £76 down to the minimum of £70 per £100; the average price obtained being £71 3s. 3d. p.ct.

Price of Gas at Worthing.—The Worthing Gas Light and Coke Company announce that, as from the date of reading the meter indices for the Michaelmas quarter, the price of gas to consumers by ordinary meter will be reduced to 11d. per therm, or 4s. 7d. per 1000 c.ft., and to consumers by slot meter, where the price includes the rent of the meter, stove, and fittings, 13·4d. per therm, or 5s. 7d. per 1000 c.ft.

The Darlington Corporation have approved a recommendation of the Gas Committee to borrow £60,000 to meet the present commitments for extensions.

In a police-court case against youths for damage to street lamps, it was stated at Burnley that the damage last year amounted to £1000. Nearly 4000 panes of glass had been smashed, and about 500 large globes destroyed.

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